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Paper Establishes Another Record in 1940

New High Production Mark of 13,372,000 Tons Exceeds 1939 By 6½ Per Cent To Set All-Time Record—Writing Paper Output Also Reaches New High—Exports Above All Previous Shipments.

By M. C. Dobrow, Executive Sec., Writing Paper Mfrs. Association.

The American paper industry in 1940 established a new high record of production. It was the fourth new high established in the last five years. Total production in the industry in 1940 was 14,372,000 tons, 6½% higher than in 1939, the previous record.

In making these statements, it is, however, necessary to examine the breakdown by grades, because the extraordinary gains have been confined largely to kraft paper and paper board following the unusual development in the South and the increased consumption of these products through new uses. The so-called cultural grades have not made such spectacular gains in the last five or six years, but in 1940 they did achieve new high records, exceeding the 1929 production.

Because of the war, exports in 1940 of all grades of paper and paper products were valued at $65,197,000 as compared with $30,491,000 in 1939, an increase of 114%.

It is interesting to note that in 1940 the capacity of the paper industry and its actual production were about 50% higher than they were in 1925, only fifteen years ago.

Because the paper and pulp industry is an old industry, it is not generally recognized that it too has in recent years made important contributions to the industrial and social welfare of the country to an extent favorably comparable to the contributions of the glamorous automobile industry.

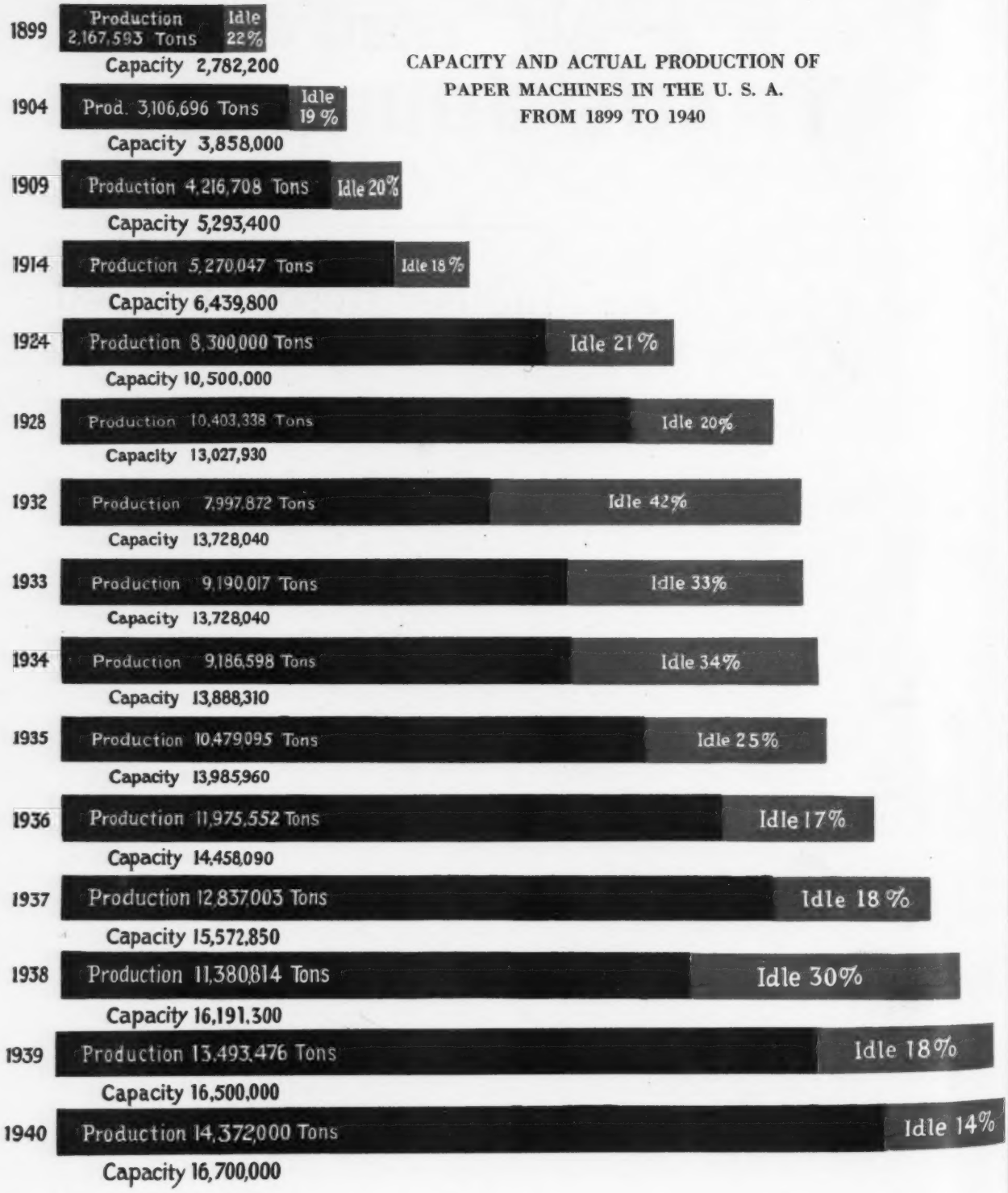
Technological improvements in paper making have resulted in higher qualities of product and lower prices per pound for the consumer to pay. Throughout this period when the trend was to greater production, constant improvement of quality and lowering of average price per pound, the general trend of the industry's employment has been upward. True, the industry produces more paper per employee than ten years ago, but increasing total production has overcome the technological unemployment which often follows such development, to an extent that the industry in 1940 employed 12% more wage earners than it did in 1929. Moreover, the average worker in this industry in 1940 was able to buy with the money in his weekly pay envelope 14% more goods and services than he could buy in 1929. For these achievements the paper industry is justifiably proud.

The paper industry usually follows the changes in general business. In 1940 the Federal Reserve Board average of industrial production was 122 (1935-39 = 100). This compares with 108 in 1939, a gain of 13%, and 8% higher than the production of 1937, the previous high. It must be recognized, however, that the biggest gain in general production last year was in the durable goods industries. That index was at 135, a gain of 25% over 1939. The non-durable goods index, largely consumer goods industries, and to which the paper industry is more closely related, was 113, a gain of only 5% over 1939.

U. S. CAPACITY AND PRODUCTION OF PAPER BY GRADES

Grade	1929 Capacity Tons	1929 Actual Production Tons	1929 %	1937 Capacity Tons	1937 Actual Production Tons	1937 %	1939 Capacity Tons	1939 Actual Production Tons	1939 %	1940 (Estimated) Capacity Tons	1940 (Estimated) Actual Production Tons	1940 (Estimated) %
Writing Paper	670,000	607,590	91	757,020	582,147	77	730,000	594,594	81	750,000	625,000	83
Cover Paper	32,000	28,072	88	40,300	24,437	61	30,000	19,401	65	30,000	20,500	68
Text Paper	.....	.....	..	.....	.....	..	15,000	12,339	82	16,200	13,500	83
Book Paper (Uncoated)	1,700,000	1,497,912	88	1,904,640	1,520,523	80	1,930,000	1,534,591	80	1,990,000	1,624,000	82
Wrapping Paper	2,000,000	1,605,783	80	2,351,660	2,053,387	87	2,610,000	2,238,993	86	2,620,000	2,350,000	90
Newsprint	1,695,080	1,409,169	83	1,000,370	975,854	98	990,000	954,259	96	1,030,000	1,030,000	100
Paperboard	5,696,870	4,451,187	78	7,168,130	5,802,036	81	7,630,000	6,104,968	80	7,640,000	6,550,000	86
Tissue Paper	442,680	387,811	88	648,210	540,152	83	790,000	665,723	84	793,000	720,000	91
Building	850,000	659,178	78	859,630	608,086	71	938,000	645,924	69	938,000	690,000	74
Groundwood	617,850	493,533	80	557,070	518,332	93	630,000	540,342	86	632,000	560,000	89
All Other Paper				285,820	212,049	74	207,000	182,342	88	260,800	189,000	72
Total	13,704,480	11,140,235	81	15,572,850	12,837,003	82	16,500,000	13,493,476	82	16,700,000	14,372,000	86

CAPACITY AND ACTUAL PRODUCTION OF PAPER MACHINES IN THE U. S. A. FROM 1899 TO 1940



Courtesy of M. C. Dobrow, Executive Secretary, Writing Paper Mfrs. Association

It is really to this gain in the consumer goods industries that the increases in paper production and consumption should be correlated, rather than to the heavy goods industries which do not increase their consumption of paper in the same ratio to their increase in output.

Writing Paper Production and Outlook

Total United States production of writing paper in 1940 was 625,000 tons, a new high record. This compares with 594,600 tons in 1939, and 607,590 tons in 1929.

Shipments into the domestic commercial market were less in 1940 than they were in 1939, despite the gain in consumer goods industries. Actual gain in production was achieved by increased volume of exports and increased shipments to the United States Government.

Export shipments of all grades of writing paper in 1940 were 50,493 tons, as compared with 19,665 tons in 1939, a gain of 157%. Before the war such shipments were at a rate of less than 3% of domestic production. In July last year, they reached 14%. For 1940 as a whole, they averaged 8% of domestic production.

Takings of the United States Government increased from 7% of domestic production in 1939 to 9% in 1940.

Although shipments to the domestic commercial market were lower, consumption probably was higher. Following the outbreak of war in September 1939, there developed an hysterical wave of buying based on the mistaken notion that the paper industry would not be able to take care of all consumption demands. This overbuying, together with reduced shipments to the commercial market in 1939, probably provided ample paper supplies for the increased consumption of 1940. It is believed that this overstocking was washed out by the end of 1940, and that current orders are more in line with actual consumption.

Business improved considerably after the turn of the year. The work of the great program of national defense proceeds on an accelerated basis and is increasing consumption. Each month expenditures are larger than the previous month. Each month more people are employed in the production of heavy goods industries. And in each month the income payments grow and consumer goods spending begins to blossom out. Retail sales are making phenomenal gains compared with figures of last year, and are expected to continue these gains in the months immediately ahead.

The requirements of the United States Government, the defense agencies and the export business (these factors combined) should average more than one day per week's production in 1941. This business and the volume of commercial business as reflected in the increasing gains in the consumer goods industries, are expected to provide sufficient business to operate paper mills reasonably full for at least the first half of 1941. The outlook for the second half of this year depends to a large extent on the nature and extent of our transition from a peace to a war time economy.

Survey of Pulp Supplies

In no year in recent history, not even during the years of World War I, were there as many violent changes in the normal flow of pulp trade as there were in 1940. The sudden invasion of the world's leading producers of pulp last April, and the bottling up of shipping facilities for this commodity, created a serious problem for American producers of paper and pulp.

In attempting an analysis of conditions, a brief summary of a few vital statistics of international trade in pulp should first be considered. Of the normal world supply of chemical pulps the Scandinavian countries of Norway, Sweden and Finland produce 33%, United States 31%, greater Germany (including Czechoslovakia and Austria) 13%, and Canada 11%. On the export side of the picture the Scandinavian countries account for 70% of the world's exports of pulp, Canada for 13%, greater Germany for 8%, and the United States for 5%. Normally the United States consumes approximately 1,500,000 tons of chemical pulp imported from European sources each year. This represents 25% of our domestic consumption.

With the shutting off of all pulp supplies from Europe, American consumers and producers of pulp were faced with a problem of making ends meet by increased production in the United States and Canada. It must be conceded that the pulp producers on both sides of the border responded exceedingly well and quickly in making up for the loss of supplies from abroad. Total United States production of chemical pulp in the last five years is recorded as follows:

Year	Tons
1936	4,212,242
1937	4,962,577
1938	4,596,037
1939	5,540,674
1940	7,000,000

By the time shipments from Europe stopped, there had already been accumulated in this country considerably large reserve stocks. The higher prices bid for Scandinavian pulp resulted in the transfer of practically all of their inventories to this country in the period from September 1939 to April 1940. Since that time, increased domestic production and increased imports from Canada have to a large extent offset the almost complete cessation of European imports.

After the closing of the Scandinavian peninsula from the world markets, it looked as if the United States and Canadian pulp mills would have to supply not only the paper mills of the North American continent, but also the paper mills in European countries which were heretofore dependent on Scandinavia for their pulp supplies. Requests for additional pulp tonnage from continental and English mills, became quite urgent. The collapse of France in June altered the picture materially. Many of the large orders from European mills were cancelled, but the demand from other than European sources has continued in fairly large volume, as evidenced by the fact that exports in the second half of 1940 were at the rate of over 500,000 tons per year, as compared with a pre-war rate of all our exports of about 200,000 tons per year.

In the middle of the summer, a small amount of imports of pulp from Finland began to arrive in this country. We received some 5,000 or 6,000 tons of pulp per month. This pulp was shipped overland on trucks about two hundred miles from the pulp making centers to the northern port of Petsamo, and then by steamer to New York.

The large stocks which were built up in the U. S. in the early months of the year before the invasion of the Scandinavian peninsula were reduced every

month, even in the months of declined paper production.

It seems apparent from the operating ratios published by the American Paper & Pulp Association that the domestic production and Canadian imports are sufficient to support an operating ratio of approximately 82%. The extent of the decline in reserve supplies each month has been roughly in proportion to the extent that domestic paper production has exceeded 82% of capacity.

Of course, the net result of increased production, consumption and changing picture of imports and exports is reflected in the inventories available at the end of each month.

The following is a compilation of the total chemical pulp stocks available in the United States to mills purchasing pulp. In making these estimates, account has been taken of the inventories on hand at paper and board mills buying substantially all the pulp which they consume, dock stocks of domestic and foreign pulp at Lake ports and Atlantic seaboard, and inventories on hand available for sale at pulp mills.

STOCKS OF CHEMICAL PULP
(In Short Tons)

1940	
January 1	789,400
February 1	841,000
March 1	855,800
April 1	819,700
May 1	771,600
June 1	690,350
July 1	624,550
August 1	589,300
September 1	566,400
October 1	535,400
November 1	515,400
December 1	497,900
December 31	495,100

Paper mill operations in December of approximately 83% of capacity resulted in the smallest decline in the pulp inventory picture in the last ten months. January operation of paper mills at about 88% is expected to show further shrinkage in pulp reserves as of February 1st.

The following table of imports and exports summarizes the extent of the deficit produced by the sharp reduction in European imports of chemical pulps. A preview of the 1941 import situation is also indicated in the tonnage figures given below. The 1941 figures are subject, of course, to the fortunes of war.

	Imports from Europe	Imports from Canada	Total Imports	Exports	Net Addition to U. S. Supply
1939	1,323,000	476,000	1,799,000	140,000	1,659,000
1940	387,000	667,000	1,054,000	481,000	573,000
1941	70,000	680,000	750,000	400,000	350,000

It is expected that paper mill operations in the first quarter of 1941 will be in the neighborhood of 90% of capacity. Such operations must result in further material reduction of the reserve pulp supplies for those mills who buy substantially all of the pulp which they consume.

At the beginning of the war, European shippers delivered pulp on old contracts at the prices previously made, but the war clause in these contracts was invoked, and the increased cost of freight and insurance was for the account of the buyer. Soon thereafter the prices for pulp on these old contracts were also increased due to the increased cost of manufacture in Scandinavia. After the Scandinavian invasion, European pulp spot supplies available here advanced still further. Urgent bidding for pulp supplies increased spot prices by 50% to 100% (depending on the grades) in the first year of the war.

Domestic contract prices were adjusted at the end of each quarter to somewhat less than spot price existing in the market.

As a result of all these violent changes, by the end of the year producers of paper, buying pulp had to reckon with an increase of approximately 50% in the cost of their basic raw material. Inability of producers to get anything like a corresponding increase in the price of the finished product, produced a somewhat unhappy situation for those mills who are largely dependent on purchases of pulp for their basic raw material.

Good Demand For Paper Making Materials Caused Moderate Rise in Prices

By Walter R. Hicks, of Daniel M. Hicks, Inc.

Writing a yearly review such as this, in addition to the pleasure of seeing one's words in print and as we fondly hope, having them read, affords the opportunity to do what we seldom, in our feverish pursuit of the fruits of the future, take time to do—sit quietly and look back a whole year of one's life and the world's history to see how far we've come; what advances have been made or what changes wrought. To do so in the line of anything so colorless and mundane as the prices of paperstock, is in a sense, to prostitute the opportunity, albeit it is a field in which one's efforts can safely be said to be quite exclusive.

Irresistible as is the lure of 1940's many happenings and strong the temptation to comment on them as they crop into our mind, we must stifle such a natural inclination and confine ourselves to tracing the rise and fall of the Scrap Empire or more exactly perusing the practically static condition of the decadent and lifeless shell of what was once a vigorous contingent of hardy, independent and well thought-of commodities, sensitive to the old, dependable, logical influences of supply and demand.

So, conscious of the relative absolute unimportance of such a rehash in the face of 1940's many tremendous events and trends, domestic and foreign, political and social, repetitious and previously unimaginable, we proceed. Prices are on an f.o.b. New York basis, except where otherwise mentioned.

Only where pulp shortage was felt do we find a consciousness of the importance of this lowly class of material. For we find that when pulp inventories worked low and imports were not forthcoming and domestic pulp supplies inadequate or unsuitable, the board and paper mills rushed headlong for secondary sources of their requirements, and kraft specialties

and staples advanced sharply from the New Year levels. This condition is not found until about May, for it is then that we see high or at least relatively high prices on such grades.

Old kraft papers which were at $20-21 per ton, New York, in January advanced to $33-34 in May and held until June, gradually losing ground to close at $16-17 in December. Kraft corrugated followed the same pattern, maintaining a $1-3 margin under the other grade. Kraft corrugated cuttings which were $31 at the New Year hit $45 in May and held there through the summer and early fall, receding to $33 in Christmas week. Kraft envelope hit $65 at the peak in the summer, closing at the opening figure of $45. Kraft bag waste followed an identical trend, $37 to $50 and back to $39-40.

The "white" grades are not so sensitive to the condition of the pulp market, hence we do not see such a pronounced trend paralleling the pulp market. In fact these grades were all at levels at the beginning of the year, which they could not maintain and only in the contra-seasonal abortive early summer "boom" did they return to, and exceed these levels. Hard white shavings at $55 in January dropped down gradually to $45 in early May, and then climbed back and up to $60 in late June. In August this grade started weakening, hitting $53 but closed strong at $65 in November and $60 in December.

Hard white envelope cuttings show the same trend at a $5-8 margin over the previously mentioned grade. Soft white shavings followed suit $43 down to $36 to $55 to $45 to $55 to $45. White ledgers were $31-32 in January. $40 in May and closed at $30-31. White blank news—was in good demand all through the year, due to shortage of dry groundwood, as Woody Fly Leaf Shavings and other Groundwood grades. The subject grade hit a high of $40 in June, having opened at $37 and closing at $32. The low on this grade was $30 in April-May. No. 1 books and magazines hit the phenomenal price (for recent times) of $25 in July's active market. This grade opened at $14 f.o.b. New York and was back where it started at the year end.

The "Unholy Three"—Mixed, News and Corrugated, acted exactly as one would expect, knowing the influences and conditions under which these grades are bought and sold. As active as were board mill operations and as important the tonnages of waste paper consumed, at no time did any one of them get out of hand. The year's high for Mixed Papers was $9.50 f.o.b. New York, which was attained in early July—the high point for practically all grades. Opening at $6, the grade lost ground to $3.50 (or should we say, was depressed?) after the summer high and a few week-to-week ups and downs of no importance, this grade wound up at $5.50.

"News" selling at $10 in January, dropped down through the Spring to $6.00 hit $13.50 in July and at the bell was $9.00.

Corrugated maintained the usual margin with News and its fluctuations followed hand in hand with those of its companion. It would seem that the situation, formerly so widely decried, in which the bulky grades find themselves, is here to stay—and no further comment is necessary.

A commodity which in no instance provides for an interesting comment in its 1940 activities. The condition of the Roofing market would be lack lustre under normal circumstances, and in view of the war and the cutting off of all European imports, we have only to admit that nothing, ever, under the sun can shake this grade loose from the chains that fetter it. The high of the year was January's $25 delivered price for No. 2's, with No. 1's at $29. Spring and summer and fall saw the grades fluctuating around a dull $16-17-18, for No. 1 with No. 2 at the usual $2 margin above it. The grade stiffened to $22 in December, which in view of mill operating levels, and the expanding defense preparations—is truly a remarkable price for a very essential commodity.

Papermaking rags without exception show no noteworthy fluctuation. Narrow ranges prevailed in all grades and January levels were the highs in most cases. The high and lows, with lows at the year end, for a few key grades were—White Shirts $7.50-6.50; Unbleached Muslins $7.50-6.25; Blue Overall Cuttings $5.00 - 4.25; Light Flannelettes $5.00 - 4.25; Silesias $4.75-4.25; Percale Prints $4.50-3.75. Lack of important export interference with domestic consumption and the increasing apparent indifference of mills to packers' desires or claims can be accepted as the cause of such narrow margins and dull market in rags and cuttings. There was a renewal of the "Raw Cotton" activity and much excitement over government subsidy and many dire predictions, but the incursions of the virgin fibre were scarcely felt and to date effects and outcomes are all in the speculative stage.

Manila Rope was one commodity whose scarcity, due to sharp cut in imports, was felt, which condition is reflected in the prices prevailing throughout the year and at the year-end. Both foreign and domestic were worth practically the same all during the year, despite published prices. January's $4.50 Eastern shipping point was the low for the year. The grade was bringing $5.25 at the year-end and moved well at all times, foreign parcels being readily taken, although very scarce and domestic supplies being held in great respect.

Bagging due to its comparatively negligible use in paper making was never exciting, $2.50 to 3.25 were the limits within which this grade was bought and sold.

The above will about give us an idea, should we later ever have occasion in years to come, to look back to see how things were during "the last war". As we see it now—we'll be pretty well off, despite its uninteresting drabness, if we can sit calmly in a well-lit city, with wife and family around us and read such a market review. A casualty list would be lots worse, wouldn't it?

Book Paper Production Gains

By Clarence A. Clough, Chairman Book Paper Mfrs. Assn.

Production of uncoated book paper in 1940 amounted to 1,424,000 tons as compared with 1,374,000 tons in 1939, an increase of 50,000 tons or 3.6%. This production also exceeded that of 1937 by 9,000 tons. Shipments of uncoated book paper in 1940 amounted to 1,405,000 tons which was also greater than shipments in 1939 and 1937.

Production of coated book paper fell off from 290,000 tons in 1939 to 258,000 tons in 1940. Shipments in 1940 were 259,000 tons, almost the same as production.

The present trend in production of both uncoated and coated book paper is upward.

Continental News Print Production Exceeds Output for 1939 By 688,000 Tons

By Royal S. Kellogg, Secretary, Newsprint Service Bureau.

Most factors in the business picture in the United States in 1940 were affected by war or preparations for war. In 1941 all of them will be so affected. Under these circumstances a review of past happenings and the causes therefore is easily made, but a preview of events to come is almost impossible.

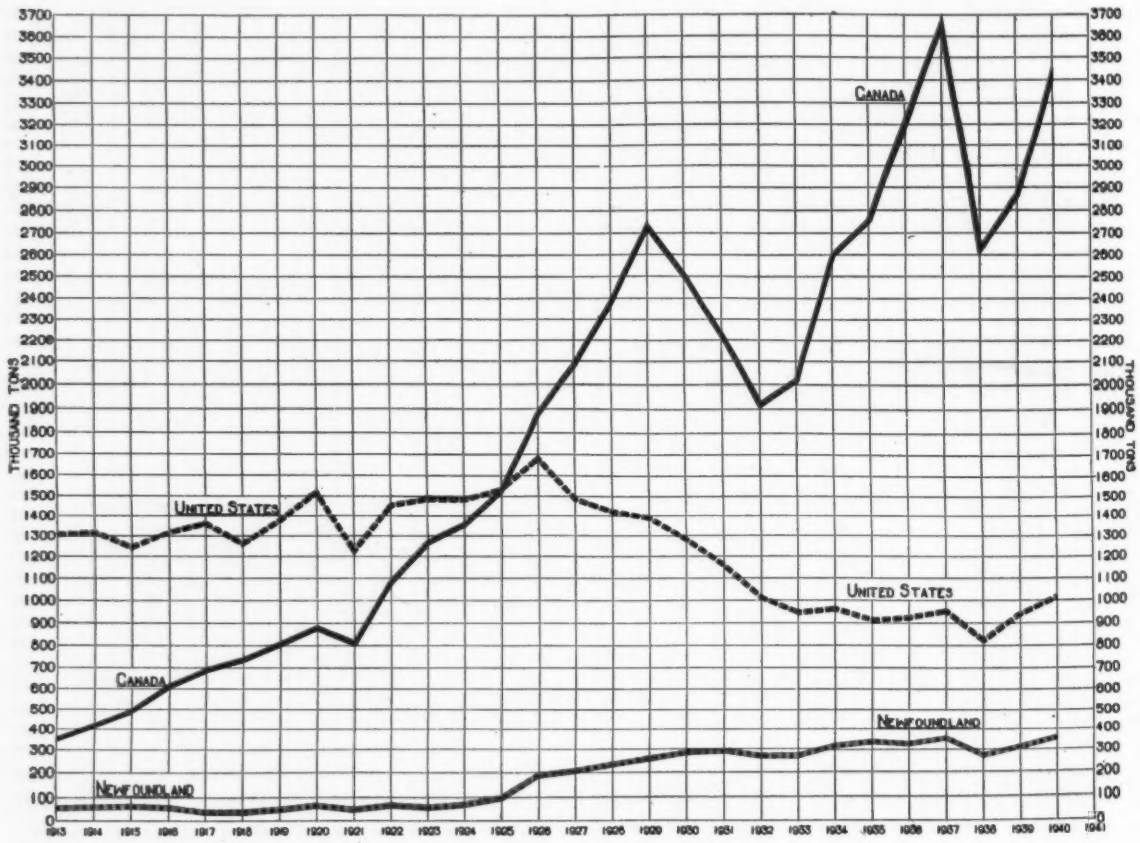
In total, business activity in the United States reached a new all-time peak during the latter part of 1940 and starting from that high level is going still higher in 1941. A new tonnage record was set last year in the output of steel whose uses are manifold and in war materials, of overwhelming importance. The general index of *Business Week* averaged 15.7 % higher in 1940 than in 1939.

A gain of 16% in North American news print production last year over 1939 ranks up well with the foregoing. When, however, we find that the increase in news print consumption in the United States in 1940 was only 4.6% and that newspaper advertising went up only 2%, it is evident that there can be great activity in important segments of industry and trade without a corresponding rise in the use of paper.

Production Increased 668,000 Tons

Continental production of news print in 1940 in round numbers was 4,785,000 tons, an increase of 668,000 tons over 1939 and, with the exception of the year 1937, the greatest on record. Since for well-known reasons the abnormal production of 1937 was followed by the subnormal production of 1938, the 1937 figure should not be used alone for the purpose of studying trends. Striking an average for 1937-38 or 4,328,000 tons gives a fairer comparison of 457,000 tons under the 1940 output. It is more correct to regard 1940 as setting the all-time high to date for North American news print output. This heavy production was stimulated by an increase of 255,000 tons in overseas exports over 1939 and a decrease of 276,000 tons in imports of European news print—both due to the war. It is obvious therefore, that without war effects there would have been no noteworthy continental news print output last year.

The North American production of 4,785,000 tons of news print was supplied to the extent of 3,419,000 tons or 71% by Canada, 1,013,000 tons or 21% by



Newsprint Production United States, Canada and Newfoundland, 1913-1940.

the United States and 353,000 tons or a little more than 7% by Newfoundland. The gain in Canada was 19.2%, that in the United States, 7.9% and that in Newfoundland 14.5%, making a combined increase of 16.2%. Canadian production was larger than in any preceding year except 1937, United States output was more than in any year since 1931, while Newfoundland turned out slightly more than in any year previous in the history of the newsprint industry in that colony. Long-time trends in news print production are shown in the chart.

On the basis of industry-accepted figures as to capacity, news print operations in 1940 were at about 78% in Canada, 93% in the United States and 94% in Newfoundland, or a continental average of 82%. Since North America was called upon to supply news print last year more widely and in larger quantities throughout the world than is likely to be the case under any peace-time set-up, it is obvious that there is ample machine capacity on the continent to take care of any foreseeable future demands for news print—providing controlled economies permit the procurement of materials, their fabrication and shipment of the product.

Shipments from the mills more than kept pace with production during 1940, so that at the end of the year there was nearly 13 percent less tonnage in mill stocks than at the end of 1939. While this percentage sounds large, it represents a decrease of only 33,000 tons since mill stocks of news print are never large in relation to the annual output.

Exports Increase 22 Percent in Year

Exports of news print from Canada in 1940 amounted to 3,243,000 tons or 95 percent of production. This was an increase of 584,000 tons or 22% from the 1939 figure of 2,659,000 tons.

Of the 1940 Canadian news print exports, 2,586,000 tons or 80% came to the United States and the balance of 657,000 tons went all over the world. The increase in shipments to the United States last year was 380,000 tons or 17%, while the gain in overseas shipments was 204,000 tons or 45% from the 452,000 tons sent overseas in 1939.

A study of the details of Canadian overseas shipments of news print in 1940 gives abundant evidence of the effect of the European war. Due to restricted consumption in the United Kingdom, 145,000 tons were shipped there in 1940 compared with 177,000 tons in 1939. Elsewhere, however, it was a different story. Australia and New Zealand took 193,000 tons compared with 154,000 tons the previous year, Argentina 87,000 tons compared with 38,000 tons, Brazil 33,000 tons compared with 6,000 tons and Mexico 30,000 tons compared with 3,000 tons the preceding year. China received 13,000 tons of Canadian news print, British India, 25,000 tons and the rest of Asia 12,000 tons, a total of nearly 50,000 tons contrasted with 5,000 tons in 1939, and so around the world Candian news print is being called upon to take the place of much tonnage normally going to these markets from Europe, which because of the war was unable to move.

Newfoundland sent 196,000 tons or 56% of its production overseas last year, the balance going to the United States. This was an increase of 19,000 tons in the overseas shipment from that colony in 1939.

Exports of news print from the United States amounted to something last year for the first time since 1920, with a reported total of approximately 44,000 tons. The causes therefore, of course, were the same as for the increase in Canadian shipments. United States news print in 1940 went to the extent of 21,000 tons to China and other Asiatic countries, 11,000 tons to the Philippines and 10,000 tons to Cuba, Central and South America. While the total after all was not large in tonnage, it was nearly three and one-half times as great as in 1939.

It should be noted, however, that the United States official figures on news print exports include considerable paper which is not standard news print. It is probable that standard news print exports from the United States did not exceed 15,000 tons.

Imports Dwindle to 34,000 Tons

Aside from the imports from Canada and Newfoundland of 2,729,000 tons, news print coming into the United States last year was less than the amount exported and amounted to only 34,000 tons. This total was made up of 23,000 tons from Finland, 9,000 tons from Sweden and not quite 2,000 tons from Norway. Nearly all of the overseas news print came during the first four months of 1940. Since that time there have been only occasional partial cargoes along with other goods exported from Finland via Petsamo, since to get to Petsamo from railhead involves some 300 miles of truck-haul over a gravel road.

Production of pulp and paper in Finland, Sweden and Norway has been difficult since the capitulation of Finland to Russia, the invasion of Norway by Germany and the bottling-up of Sweden. Reports from the associations in those countries give a total of 86,000 tons of news print produced in Finland during the first eleven months of 1940 compared with 505,000 tons during the corresponding period in 1939, and of 116,000 tons made in Sweden during the first nine months of last year compared with 225,000 tons in the same months of 1939. In November, for example, the total output of the Finnish news print mills was only 6,000 tons. Not a scrap of information as to news print production has come from Norway since the Nazis entered.

The total of 34,000 tons of European news print imported into the United States in 1940 was, of course, very much less than in any year since that large movement started in 1920. It did not get well underway until the final quarter of 1920, but nevertheless 50,000 tons came in that year.

Stocks on Hand Moderate

Stocks on hand or in transit to the publishers reporting to the American Newspaper Publishers Association were 356,000 tons at the end of December, an increase of 28,000 tons from December 31, 1939. This increase did not equal the decrease of 33,000 tons in the stocks of manufacturers during the same period. In other words, there is no oversupply on either side and only a fair reserve to allow for contingencies which often arise during the time of war and preparations for war.

Following the policy urged upon them by the officers of the American Newspaper Publishers Association, the publishers during 1940 made more than a usual endeavor to take their estimated yearly requirements in equal monthly instalments. Thus the stocks which were built up in midsummer were brought down steadily during the period of increased

consumption in the fall, and mill shipments went forward at a good rate throughout the year.

Consumption Gains 4.6 Per Cent

The 421 publishers reporting to the American Newspaper Publishers Association used 2,856,000 tons of new print paper in 1940, a gain of 126,000 tons or 4.6% over 1939. This checks out very closely with the forecast made early in the year of an increase of approximately 5% based upon replies from 962 publishers. The careful forecast made by the American Newspaper Publishers Association on such a wide basis was most useful to both producers and users of news print, and that it should have been so closely approximated is an example of effective statistical work.

Month-by-month comparisons of news print consumption last year with the corresponding months in 1939 give some erratic results, not in line with fluctuations in the volume of newspaper advertising. The explanation therefore is evidently changes in sizes and circulation due to varying war interest. The extremes were represented by an increase of 11% in consumption in the month of May—when Germany went into the Lowlands—and none at all in the month of September. The rise of 4.6% for the year is pretty good compared with a newspaper advertising increase of 2%.

On the assumption—which in 1939 seemed to be approximately correct—that the publishers reporting to the American Newspaper Publishers Association used about 77% of the United States news print consumption, the grand total in 1940 was around 3,700,000 tons.

A newsprint consumption of 3,700,000 tons in the United States last year was the equivalent of 56 pounds per capita. This was 2 pounds more per capita than in 1939, but less than the per capita consumption in 1929, 1930, 1936 and 1937. As time goes on it is increasingly probable that the per capita consumption of 62 pounds in 1929 was the all-time high, and that the present per capita rate can be regarded as about all that may be expected.

Leading daily newspapers average exactly the same size in 1940 as in 1939, i.e., 27 pages. This was one page more than in 1938 but one page under 1937. It was also no larger than in 1923 and 5 less than the 1929 average of 32 pages.

Sunday newspapers made real gains last year with an average of 86 pages compared with 82 in 1939. This made the Sunday issues the largest in any year (except 1937) since the average of 91 pages in 1930. The December average of 90 pages was 7 pages larger than December the preceding year and with the exception of 1936 has not been surpassed for that month since December 1929.

Circulations of Newspapers Gain

The annual compilation by *Editor and Publisher* of the circulations of English language dailies in the United States based upon returns which are required to be made to the Post Office Department shows gains which everyone knew must be taking place, although not large percentages.

The total circulations of morning, evening and Sunday newspapers is given as 73,254,000 copies for the 12 months ending September 30, 1940, compared with 71,190,000 copies for the preceding 12 months, or a gain of 2.9%. These were the largest circulations ever reported in morning and Sunday papers. The aggregate circulations of morning, evening and Sunday papers were 10.5% above the 1929 figure. The gain, however, was most unevenly distributed among these publications. Morning newspaper circulations last year showed an increase of 11.5% over 1929, evening newspapers a slight decrease and Sunday newspapers a gain of 20%.

While the Sunday newspaper is still a good deal smaller than in 1929, an increase of 20% in circulation indicates that it is an important factor in news print consumption.

Advertising Increase Small

Advertising in 1940 continued the tendencies so strongly manifest in 1939 and earlier, i.e., small growth in the volume of newspaper and periodical publicity and large additions to paid time on the air. This sort of thing has gone on for so long that it looks like becoming a permanent characteristic in the field of merchandising. Some of the more striking details follow.

Newspaper advertising in 1940 aggregated only 2% more in agate lines than in 1939. While 4% above 1938, it was 10% below the volume attained in 1937 and 8% below that in 1936. Going still further back, last year's newspaper advertising was 33% under the peak attained in 1929. Moreover, last year's month-by-month record was an erratic one compared with the corresponding months in the preceding year. During four months—June, July, October and November—there were small decreases from the lineage a year earlier. In the other eight months there were gains ranging from 1% in January and April to a high of 8% in February. A considerable part of the latter, however, was due to 29 days instead of 28 in the preceding year. Leaving out this abnormality, the best month for newspaper advertising in 1940 was May with a gain of 7% over May in 1939. The long-time trend in newspaper advertising is shown in the chart.

The lineage of periodical advertising in 1940 totaled 5% more than in 1939. However, it was 13% less than in 1937 and 4% less than in 1936. Going back to the peak year of 1930 for periodicals, 1940 showed a falling off of 26%.

Like newspaper advertising periodical publicity in 1940 was also erratic in its month-by-month comparisons, although there were no actual decreases. In May the periodical advertising lineage was the same as in May 1939. In November the gain was 2% while the best showing was made in July with an increase of 10%.

Radio Advertising Rises

Expenditures by advertisers for radio time in 1940 on the National-Columbia networks are reported to have been $91,698,000 compared with $79,782,000 the preceding year, or a gain of 15%. Similar expenditures via the Mutual network were $4,767,000 last year as against $3,330,000 in 1939, an increase for this younger chain of 43%. Taking all these stations together the aggregate gain for radio advertising last year was apparently around 16%.

This increase was also well distributed. There was not a single month of 1940 in which radio advertising did not materially exceed the volume in the corresponding month of every preceding year. This would suggest that gains in radio advertising may be not only permanent but general. The chart shows the

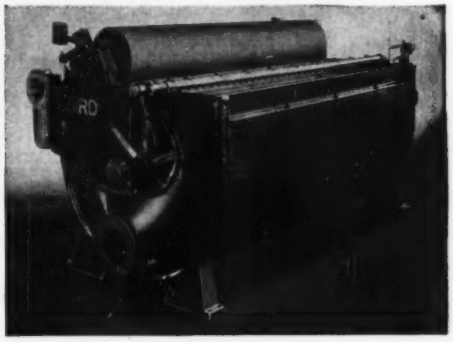
CONVENTION REPORT

entitled "How to Make More and Better Paper at Lower Cost"

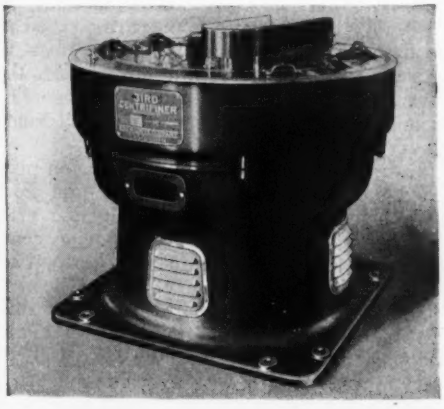
However your production problem may be affected by current conditions one or more of these modern Bird Machines will go a long way toward helping you solve it.

THE BIRD SCREEN — provides the correct combination of large screening capacity and efficient screening action, using the finest possible screen slots for your grade of stock. Modern Bird Screens are essential for *more and better paper* at lowest screening cost per ton.

THE BIRD PURIFINER — for continuous removal of both light and heavy dirt from paper stock. Simple, compact, no moving parts — the most recent advance in dirt removal equipment.

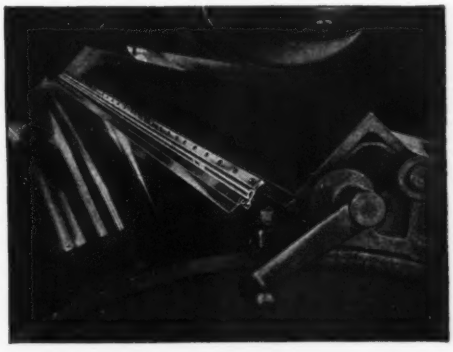


THE BIRD SAVE-ALL — essential under today's conditions for mills dependent on outside sources of stock. Recovers stock from waste water at lowest net cost per pound. Puts both fibre and water in shape for immediate re-use.



THE BIRD CENTRIFINER — with the exclusive triple treatment operation that assures cleanest, most salable paper with a minimum of rejects.

THE VICKERY FELT CONDITIONER — a "natural" for those whose problem is increased output from existing paper machines. Assures continuous, uniform press felt operation without shut-downs for wash-ups.



THE VICKERY DOCTOR — engineered expressly to keep each paper-making roll in shape to do its best work — ideal for press rolls, breast rolls, wire rolls, dryers, calender and super-calender rolls both steel and composition.

For full information, layouts and estimates get in touch with

BIRD MACHINE COMPANY, South Walpole, Massachusetts

BIRD MACHINERY

steadily increasing volume of radio advertising as well as the seasonal fluctuations.

Counting in the cost of talent and follow-up with the cost of time on the air, it seems certain that the total expenditure for radio advertising in the United States in 1940 must have been at least $200,000,000, (one radio enthusiast estimates this at 250 million dollars) thus putting radio among the major factors in the distribution of goods because such a sum as this would not have been spent without tangible evidence of returns thereon.

Advertising Lost from Newspapers

The published lists of advertisers and the classes of products given wide publicity by means of radio, show that consumers goods are the most widely merchandised in this fashion. If the figures of recent years mean anything, they indicate that a great deal of advertising for such goods is permanently lost from newspapers and periodicals. It is claimed that on January 1, 1941 there were 50 million radio receiving sets in the United States, so it has become physically possible to reach a very large proportion of the population simultaneously and on exceedingly short notice.

Outlook for Newsprint

Some sidelights upon life and activity in the United States are shown by the following estimates for the year 1941:

16 million owners of securities; 46 million savings accounts; 64 million life insurance policies; 29 million automobiles, trucks and buses; 14 million owners of homes; and 20 million telephones.

These are some of the lines in which there is a large and permanent opportunity for replacement and extension under anything like normal conditions. Under the controlled economy of war and prospective war, much money and effort which might continue to pour into these fields will be switched elsewhere. For example, it is estimated that the aviation industry has undelivered orders totaling around 4 billions dollars or eight times as much as a year ago. This shows what sudden and tremendous shifts in activity war can bring about, to say nothing of the results on human life.

If—as now seems most probable—the war in Europe goes on throughout 1941, and if as seems equally certain, the United States is drawn closer thereto, certain tendencies will appear and some conditions already existent in 1940 will be continued.

Only Insignificant Dribbles

Due to greater restrictions on the consumption of news print in the United Kingdom—and perhaps elsewhere in the British Commonwealth—overseas exports of news print from Canada and Newfoundland in 1941 are not scheduled to reach the high peak of 1940. On the other hand, the year-long continuance of the war means that not even the 34,000 tons of news print which came from Europe to the United States in 1940 will get here in 1941. There will be only insignificant dribbles.

No Materially Larger Consumption

At this time it is not conservative to figure upon any materially larger consumption of news print in the United States in 1941 than occurred in 1940. Sustained newspaper circulations are not likely to be much greater than at present. It is doubtful if there will be any improvement in national newspaper advertising. If there is any increase in newspaper advertising in the United States in 1941, it will most probably be for consumer goods. With a high rate of employment and rising wages, retail trade may increase 5 to 10% which should naturally lead to a greater volume of newspaper advertising in this field of distribution.

Production Should Be Steady

Nothing has yet occurred in North America materially to reduce possibilities of news print production. There is no labor trouble, there is no shortage of wood, and consumer relations are the best in many years. The price of news print continues below the general commodity average as shown in the chart. Before 1941 is ended, however, priorities may be established and restrictions imposed for the purpose of concentrating upon war materials which may hamper the production of news print paper. So far such obstacles are not serious. One thing does appear certain —that if any considerable amount of money is made by any business enterprise in North America during 1941, a very large part of it will be taken by taxes.

B. C. Sets New Pulp and Paper Record

British Columbia's pulp and paper industry set a new record in volume and value of production last year, according to available incomplete records, and is headed for another high mark in 1941 if present rate of output is maintained.

Individual companies do not give out definite figures on the year's production and revenue, and government statistics are not issued until much later in the year; but it is estimated that Powell River Company and Pacific Mills Ltd., the two big newsprint organizations, together produced about 270,000 tons in 1940, which represents about $13,500,000 at the current base price of $50 a ton.

This figure surpasses by half a million dollars the ten-year average revenue of the pulp and paper industry, including not only newsprint, but all kinds and grades of pulp.

B. C. Pulp and Paper Company, with rayon pulp and bleached sulphite mills at Woodfibre and Port Alice, was a bigger factor in pulp production than ever before, because removal of Scandinavian competition and other factors brought a swift restoration of capacity operation following a period of depression in 1938-39 due to the collapse of the Oriental markets. Estimated production of the two B. C. Pulp and Paper Company's mills last year was 100,000 tons, at varying prices according to grade and market.

Purchases Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 19, 1941—During the week ended February 1, the Government purchased $2,349,378.87 worth of paper and allied products under the Walsh-Healey Act as follows: $104,928.00 worth of bond paper for War, Air Corps, from R. P. Andrews Paper Company, Washington, D. C.; $2,230,980.87 worth of fiber containers for War, Ordnance, Dover, N. J., from Seeley Tube and Box Company, Newark, N. J.; and $13,470.00 worth of book paper for Government Printing Office, from the Whitaker Paper Company, Baltimore, Md.

Accent ON Design

BELOIT BOARD WINDER...

★

PATENTED ROLL EJECTOR

MOTOR DRIVEN RIDER ROLL

SHAFT PULLER

ROLL TRANSFER AND CRADLE

AUTOMATIC SHAFT RETURN

INDIVIDUAL MOTOR DRIVEN SLITTERS

★

The development of high speed kraft machines in the South has made necessary corresponding improvements in winder performance. The winder developed by Beloit, with the cooperation of a number of mills, solves this problem in the following ways:

★ **Higher speed operation — speeds up to 3500 f.p.m.**
★ **Larger diameter rolls — sizes up to 74".**
★ **Automatic equipment to minimize down time.**
★ **Designed to make better rolls.**

BELOIT IRON WORKS PAPER MACH'Y BELOIT, WIS. U.S.A.

Engineering MAKES THE MACHINE

BELOIT

Paper Board Industry Sets Up New Record With Increase of 7 Per Cent in 1940

By Grafton Whiting, National Paperboard Association.

The paper board industry during 1940 surpassed all records for total production, with an increase of 7% over 1939, the previous high year. For six successive years, with the exception of 1938, substantial gains have been made in this branch of the paper industry.

Division of Paper Industry

Paper board is generally considered one of the divisions of the paper industry, and rightly so, since its product is made on the same types of machines and, for the most part, of like materials. The paper industry as a whole has made rapid progress during the past ten years, with a growth in per capita consumption from 165 pounds in 1930 to 205 pounds in 1939. The average yearly increase, using the method of least squares, is 3.1%, or 320,000 tons added each year.

Paper board ten years ago accounted for 40% of the total paper industry output. Last year it was over 45% and the average yearly growth was 4.5%, or 201,000 tons, compared with 1.9%, or 119,000 tons for the paper grades.

1939 Census of Manufactures

The 1939 Census of Manufactures, issued by the Department of Commerce, shows the following as to paper and paper board.

Divisions	Relation to Total		Average Census
	Tons	Value	Value Per Ton
Paper Board	45.2%	29.3%	$ 40.72
Wrapping Paper	16.6	20.6	77.90
Book Papers	11.4	16.4	90.48
Newsprint	7.1	4.7	41.67
Writing Paper	4.4	9.9	141.23
All Other	15.3	19.1	....

Although paper board is the lowest in value per ton, according to the census valuation, it is the largest division both in total tons and value of output.

Paper Board Grades

An anslysis of the paperboard group of mills shows two major divisions of output based upon the use to which the board is put; namedly, container boards and box boards. Container boards are used for making corrugated and solid fiber shipping containers which are in common use for shipments by freight, express and parcel post. A further subdivision separates container boards into liners, or the outer facings; straw, etc., commonly called .009 corrugating material, from which the inner fluted member is made; and clip, used for certain parts of corrugated containers, and for the inner plies of solid fibre boxes.

Box boards are composed of a wide variety of grades, colors and finishes, suitable for fabricating folding cartons, set-up or rigid paper board boxes and specialties. Chart I permits a comparison during the past four years of the relative volume of each divi-

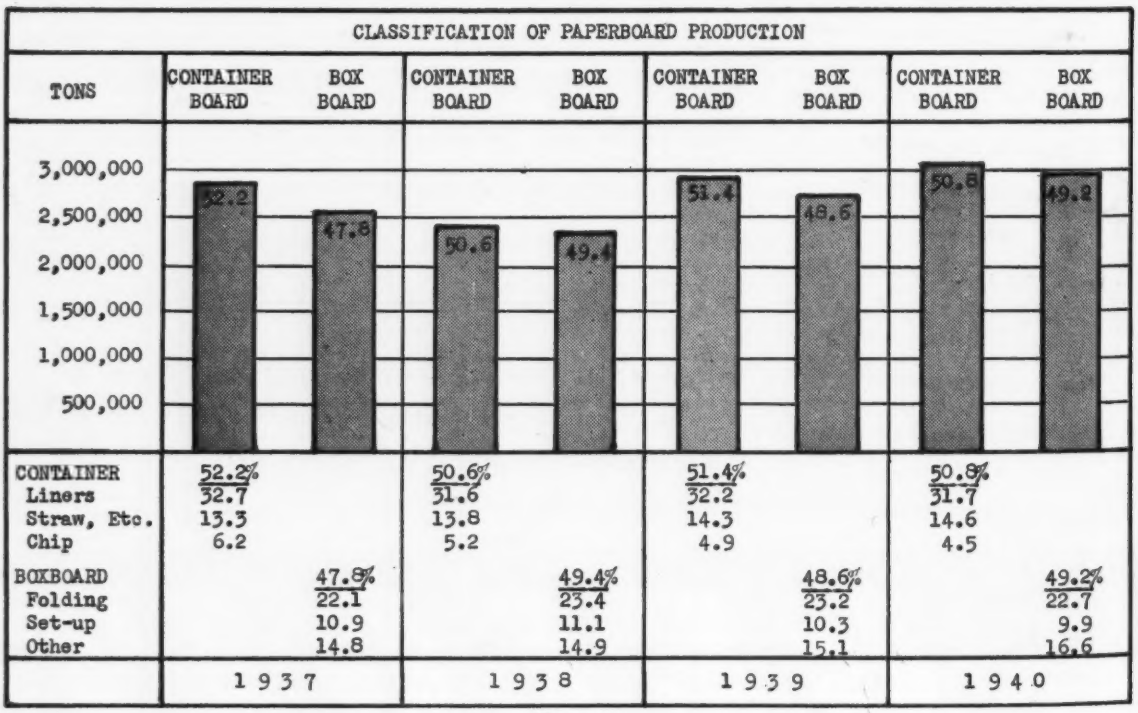


CHART I

Toughest Job

THAT'S THE BEST WAY TO TEST THE ADVANTAGES OF SOCONY-VACUUM CORRECT PAPER MILL LUBRICATION

ALMOST EVERY MILL has a "problem child"—a machine that uses too much oil... interrupts production... burns up bearings. Give us the assignment of lubricating your "problem child." We believe that results will clearly show the dollars-and-cents value of Socony-Vacuum "Correct Lubrication."

FOR EACH lubrication job in your mill, Socony-Vacuum has "correct" oils—Gargoyle D. T. E. Oil for reduction gear systems...Gargoyle Vactra Oil in Jordan collar thrust bearings... Gargoyle Voco Engine Oil No. 1 for water-wet press roll bearings.

When you call in SOCONY-VACUUM, you're assured top-quality lubricants. You profit by: 75 YEARS' EXPERIENCE... greatest in the industry; A COMPLETE LINE... the right oil or grease for every job; NEW LUBRICANTS ahead of new needs; HALF-A-MILLION CASE HISTORIES behind our engineers' recommendations; ENGINE BUILDERS' APPROVAL of our products; DISTRIBUTION throughout the world.

• • •

SOCONY-VACUUM OIL CO., INC.—Standard Oil of New York Division • White Star Division • Lubrite Division • Chicago Division • White Eagle Division • Wadhams Division • Magnolia Petroleum Company • General Petroleum Corporation of California.

"Correct Lubrication"

sion and the percentage that each of the subdivisions bears to the whole. Container boards and box boards are not far apart in total tonnage, with box boards tending to gain an equal position with container grades. If container boards were computed on an area basis, which is the unit of measurement when the board is used, there would be a larger gain than is here indicated. The reason for this is found in the fact that kraft boards, lighter in weight per thousand square feet than jute boards, are being supplied in greater quantity each year.

In the boxboard division, the folding grades are faring better than the set-up grades. This is due in part to the ease with which folding cartons can be stored and handled as contrasted with the set-up box already formed by the fabricator. The subdivision "all other" has experienced the largest growth because of the many new uses to which paper board is being put and the endeavor on the part of the mills to enter new fields heretofore supplied with a different type of material.

Raw Materials

The two principal raw materials entering into the production of paper board are waste papers and pulp. The paper is collected from stores, office buildings and homes; the pulp is produced in domestic mills and also imported from Canada and European countries.

Waste Paper

The amount of waste paper stock consumed in the United States during 1940 is estimated to be between 4,250,000 and 4,500,000 tons. The estimated total domestic production of paper and paper board is 14,340,000 tons. Added to this is the amount of imports less the exports which shows a net amount of about 2,120,000 tons, and gives 16,460,000 tons gross available. This indicates that between 25% and 30% of the available tonnage was reclaimed and used again in mill production.

The amount of waste paper collected is largely in proportion to the price paid, since with high prices it is possible and profitable to the supplier to ship paper in from outlying sections which otherwise would be unavailable. Likewise, the housewife will save papers instead of destroying them if offered a sufficient price. Seasonal variations occur due to weather conditions, particularly in the winter months. The spring and fall collections are the heaviest.

The paper board industry is the largest user of waste paper stock, although some grades are made almost entirely of prime pulp. Of the waste-using grades, the average furnish is 85% waste paper stock and 15% pulp. During 1940, with the threatened shortage of pulp, the sorting of waste papers was given more careful attention, since paper with clean long fibres were in demand. Substitution of such grades for a part of the prime pulp formerly used has been going on and without loss of appearance or serviceability in the finished product. In some instances, moreover, a saving in cost has resulted.

It is fair to assume that, with less than 30% of the available supply now being reclaimed, an increase in the collection of waste paper can be made without an undue rise in price, sufficient to meet any emergency demand that might call for a substantial increase in paperboard production.

Wood Pulp

The threatened scarcity of pulp due to the stoppage of European imports would not have been so pronounced if the consumption had not increased sharply over 1939. An analysis of the pulp mill capacity in this country and what could be expected from Canada showed sufficient volume to supply the 9,000,000 odd tons required in 1939. However, increased domestic consumption in 1940, the increase in exports, the fact that the supply was unevenly distributed by grades and the effort on the part of the purchasing mills to cover their pulp requirements, resulted in higher prices.

In 1939 European countries sent us 1,383,300 tons of pulp. In 1940, 391,400 tons were received, principally during the first few months, and almost none at all since. The United States and Canada have had to pick up the load to supply this country and provide enough for our exports, which in 1940 (11 months) have amounted to 442,100 tons, an excess of 321,200 tons compared with exports for a like period of 1939. The accomplishment here and receipts from Canada during 11 months for which records are available, show an increase of over 28% in pulp supplied contrasted with a like period in 1939. Pulp mills, formerly idle, are back in production due to the high prices, and existing mills are running full and even in excess of stated capacity. New pulp mills have come into production and others are scheduled to commence operation this year.

The increasing costs of certain grades of pulp soon led to substitutions, with the result that all pulp prices have participated in the advance. Mills formerly dependent upon European supply have had to adjust themselves to the grades and qualities of domestic and Canadian producers.

Inventories of pulp on hand January 1, 1940 showed 3.6 months' supply, based upon average consumption as reported by paperboard mills, and on January 1, 1941, 3.1 months' supply.

It is but natural that where domestic and Canadian pulp is available, paperboard mills will not feel the necessity of holding inventories as large as formerly when European pulp, transported from abroad, had to be relied upon.

Last fall it became evident that no serious pulp shortage was imminent. If this had not been the case, a sharp drop in inventories would have taken place and a rise in price would have occurred. Today inventories are only moderately lower, and prices remain unchanged.

Officials of the National Defense Advisory Commission have concluded that the supply of woodpulp in this country in 1941 should be sufficient to meet requirements of domestic consumption and probable exports, and industry leaders have assured the Commission that further price advances would be made only as warranted by specific increases in cost.

Seasonal Variations

The demand of paper board varies during a normal year in response to the requirement of fabricators of shipping containers and cartons. These fabricators, in turn, are governed by orders from their customers, many of whom cater to the spring and fall trades. Thus two periods of greater activity are found, followed by recession in the summer and at the year end.

The Seasonal Variation Chart II illustrates the change, and is here shown as an average year. The purpose of this is to permit comparison with any single year and to note the time and extent to which general business conditions or sudden changes of

PULP

Perkins-Goodwin Co.

ESTABLISHED 1846

30 ROCKEFELLER PLAZA • NEW YORK

CHICAGO OFFICE: CHICAGO DAILY NEWS BLDG.

PAPER

world or domestic affairs alter the usual flow of demand.

The chart is a composite covering 10 typical years of actual hours of operation, contrasted with full operation at 144 hours per week of identical mills representing a large percentage of the industry. The activity during the year 1938, 1939 and 1940 is shown under the caption "Per cent of Hours Operated", Chart III.

Per Cent of Hours Operated

During 1938 the average activity was 61%, with the general trend following the seasonal variations, but with a stronger fall upturn than usual. In 1939 the seasonal pattern was followed for the first half year and then, with the outbreak of hostilities, there came a flood of orders from customers caught with low inventories and faced with rising prices. The peak was reached in October at 83% activity and the year end decline which followed dropped only to 71%—a level which exceeded the high performance in 1938. The opening of 1940 suffered from the over-supply during the previous months and not until May was there a belated upturn. The fall upturn was likewise slow in developing, but augmented by the anticipation of the defense spending program, reached 79% activity in October.

It has often been said that the paper board industry is dependent upon general business conditions and a comparison between the seasonal variation Chart II and each of the three years "Percentage of Hours Operated" Chart III shows how strong is this dependency.

Orders and Production

Incoming orders are contrasted with production on Chart IV by reducing each to a percentage figure with 100% equal to 6 days at full rated production. To distinguish between periods in which orders exceed production, the intervening space is left white, while production when in excess of orders is emphasized by the black area.

1938 opened with production running slightly in excess of incoming orders and so continued until August, when the seasonal upturn brought an increase in volume of orders. The year end and opening of 1939 was typical of the practice of closing down operations to permit major repairs and alterations during the holiday season. Orders here accumulate

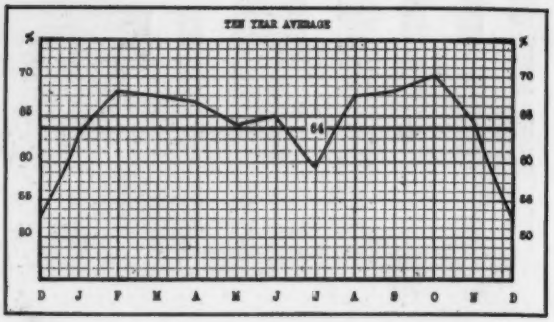


CHART II

and production is then gradually advanced to satisfy the orders on hand and take care of the spring upturn. The flood of orders already referred to, which came with the start of hostilities, is shown by the sharp advance to 109% in September (the white area), and it took 5 months, (the black area) to equalize the influx. This carried over the year end and the usual shut down period was held to a minimum.

In April, 1940, there was an improvement in demand, and a second upturn came in October, sufficient to permit better than usual operation over the year end. The significance of this display lies in the fact that following each rapid increase in orders, a reaction takes place, with production greater than incoming orders; and the duration of the period of adjustment is in ratio to the extent to which the high level has risen.

Production

A census of the industry is taken each year, including all mills known to have produced paper board. The totals for the past ten years are as follows:

Year	Tonnage	Year	Tonnage
1931	3,768,800	1936	5,290,600
1932	3,289,000	1937	5,510,000
1933	3,904,200	1938	4,896,100
1934	3,928,300	1939	5,904,000
1935	4,516,000	1940	6,300,000 (Est.)

The 1940 estimated production is 396,000 tons, or about 7%, above 1939, the previous high. Another record which was broken was that for continuous operation at high levels. For a period of 33 weeks, barring holidays, production exceeded 120,000 tons

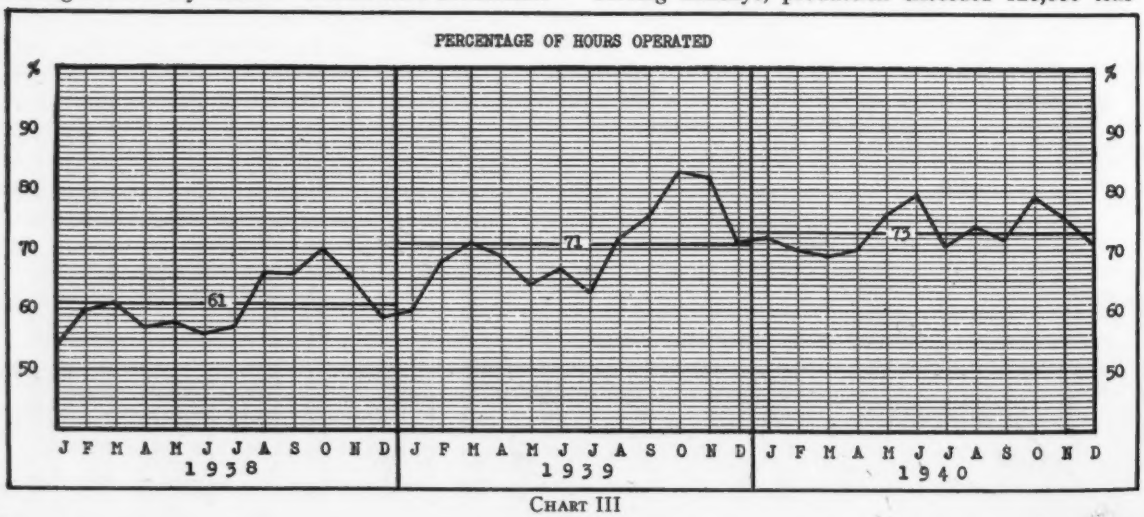


CHART III

KRAFT AT 1540 FPM..

a New Record by Crossett

HERE'S WHAT CROSSETT SAYS *about* WESTINGHOUSE CO-OPERATION

"According to the best information we have, the new speed of our paper machine is the fastest on record for Kraft paper making.

"We appreciate the help that Westinghouse people have given in making the sectional drive suitable for 1540 feet per minute operation when it was originally designed for 1250. The operation of the drive at this high speed has been entirely satisfactory."

Mr. E. A. Charlton
General Manager

IN standard production, Crossett Paper Mills run Kraft paper at 1540 feet per minute, an increase of 23% over their previous high of 1250 fpm, for which the equipment was originally designed. As far as known, this is the fastest speed ever attained on Kraft. Every papermaker knows the problems that must be overcome to run at such speed efficiently and continuously.

Westinghouse sectional drive, installed in 1937 and originally designed for speeds from 200 to 1250 fpm, has been stepped up to this new record with only very minor electrical changes. Thus Crossett gains at small cost the benefit of increased production and a substantial increase in investment return.

This accomplishment proved the "reserve" that is built into Westinghouse sectional drives. Further, it indicates the ability of Westinghouse paper-mill engineers to adapt existing equipment to new requirements. Specify Westinghouse equipment.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA.

J-9441

Westinghouse

TIME SAVER FOR AMERICAN INDUSTRY

per week; whereas in 1939 but 15 weeks were above the 120,000 ton figure. A sustained volume for so long a time makes for efficient operation, provides regular employment for labor, permits better planning and lower costs.

The tons made per one per cent of activity is not a significant figure in itself, but does serve to compare one year with another. In 1938, the tons per one per cent of activity were 80,260; in 1939—83,150; and in 1940—86,300. This continued gain is due not only to the bringing in of new and faster running machines and placing some of the older ones in reserve, but also to improvements and betterment in the existing plants.

The kraft mills making liners and corrugating material, particularly in the South, have been a factor in this increase, and their output has steadily grown. In 1938 the total kraft liner production exceeded that of the jute liners for the first time. The 1940 estimate of totals shows kraft liner at 1,169,000 tons, with jute at 794,000 tons, or 47% greater tonnage for kraft. As previously noted, the gain would be even more pronounced if based on area instead of on tonnage.

The development of the kraft mills in the South, with their pulp producing units, which a few years ago was looked upon as a dangerous threat to the stability of the industry by over expansion of capacity, has proved to be a blessing in disguise. During 1939 there were imported from Europe 485,200 tons of kraft pulp, whereas today practically none is being received, and the burden of supply has fallen mainly upon the southern kraft mills. Their ability to meet this demand is attested by the fact that the paperboard mills dependent upon purchased pulp in no instance have had to curtail production for want of this raw material.

In years such as 1939 and again in 1940, where volume is heavy and prices are fair, substantial sums are set aside for investment in plant and equipment. These are aimed to increase production, lower costs and improve quality. The effects of these improvements are cumulative and 1941 should show a continuance of the increase in the tons of output.

Days to Run

Production is dependent upon incoming orders and the difference between the two represents the bank of unfilled orders on hand. The expression "Days to Run" is used to designate the length of time at full operation it would take to fulfill all orders awaiting shipment. This is the basis upon which Chart V is drawn, with the average number of days plotted for each month. It will be noted that there is a relationship between the Orders and Production Chart IV and the Days to Run, but the latter is a cumulative record which shows the condition of the order file under which the industry is operating.

During 1938, the days to run fluctuated between 3.6 and 5.2 with an average of 4.2 days. The average for 1939 was 6.7 days with a low of 4.1 in May and a high of 13.2 in October which was caused by the influx of orders following the opening of hostilities. The average for 1940 was 6.5 days with a low of 4.9 and a high of 8.9. The comparative steadiness of the bank of orders in 1940, although lower on the average, permitted a better schedule of operation and continuity of production than in 1939.

Price Changes Small

Prices of the important grades of paper board as published by the Official Board Markets are given below for January 1940 and January 1941 as follows:

Grades	January, 1940	January, 1941
Chip Board	$40.00—$42.50	$37.50—$40.00
Single Manila Lined Chip	55.00	52.50— 57.50
White Patent Coated News	67.50	67.50— 72.50
Corrugating Material	0.69— 0.72*	0.69— 0.72*
Test Liners	1.29— 1.30*	1.29— 1.30*
Newsboard	47.50	42.50— 45.00

* Prices are stated per ton except for Corrugating Material and Test Liners which are per M Sq. Ft.

In January last year the levels attained during the close of 1939 held for the most part, but prices declined gradually until the end of the first quarter, when the bank of unfilled orders reached the low point.

With the stoppage of European pulp imports and threat of scarcity, board prices advanced and held until August, when a lessened demand resulted in re-

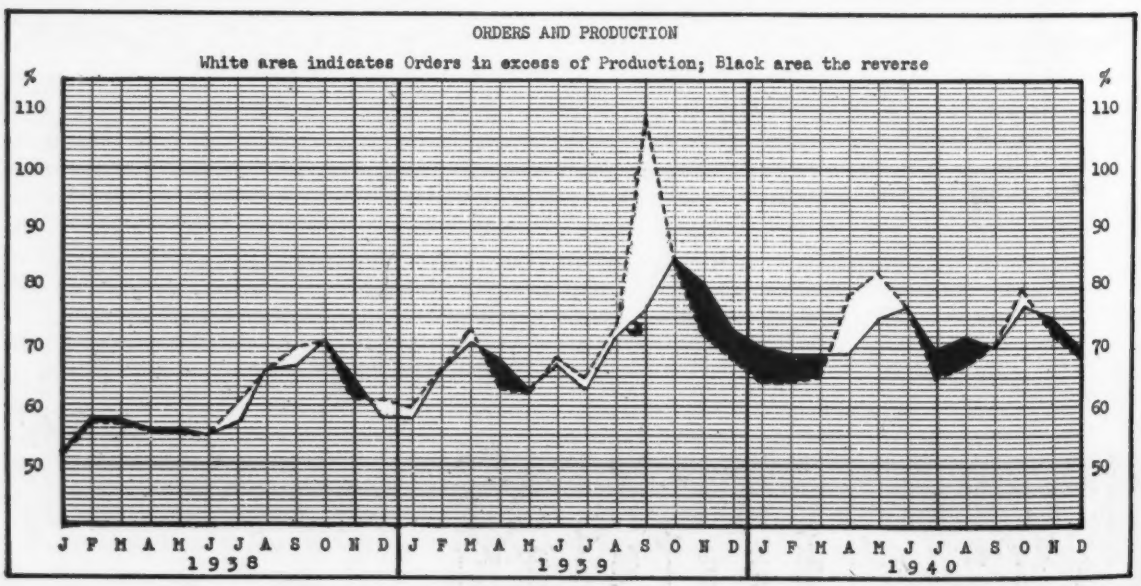


CHART IV

THE ACME VERTICAL ANCHOR METHOD

FOR ADEQUATE, *Low-Cost Protection*

FOR CHIPBOARD AND OTHER HEAVY PAPERS

COOPERATING with paper men, Acme has developed the Vertical Anchor Method for reducing damage and costs in the shipping of many types of paper. Designated as a semi-floating load, this method is proving its superiority in bracing procedure.

The Acme Vertical Anchor Method involves the threading of flat steel bands to anchor plates, nailed to the car floor. The bands are then tensioned and sealed at the front of the unit—2 bands per roll. Other details of this new and proved roll bracing procedure will gladly be furnished without obligation . . . just mail the coupon.

For every kind of paper . . . book . . . newsprint . . . bond . . . bristol . . . fine papers, etc. . . . shipped on skids, in cartons, rolls or cases, there is an Acme Steelstrap Process to literally make every shipment "Bound to Get There." Straps are quickly and effectively applied, for there is an Acme tool for every strapping job. Acme Steelstrappers, for example, tension, seal and cut the strap, besides feeding seals automatically.

For bracing carloads, the Acme Unit-Load Process is the answer for damage-free arrival for the paper of many mills. The Unit-Load booklet tells the story with pictures and facts. Send for your copy today.

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ductions. Since then prices have been somewhat firmer, but throughout the year changes have been slight, with less than $2.50 swing above or below the average.

Index of Prices Shows Same Trend

The Bureau of Labor Statistics, in the Index of Prices, shows this same trend. The index figure for the first week in January 1940 stood at 79.5, declined at the close of the first quarter to 77.6, improved again to 79.0, with 77.0 in August and 79.9 at the close of the year. Indications at the present time point to a slow improvement in the index figures and for paper board it is safe at least to predict that no material decline will be felt this year.

Outlook for 1941

The paper board industry is dependent to a large extent upon general business and the flow of commodities from producer to consumer. Now, for the first time in several years, there is a sustained upward trend in the durable goods industries which gives promise of a new phase in the business cycle. Some economists place the failure of business recovery in the past upon the lack of activity in durable goods production where the high ratio of unemployment has been most marked. Assuming that these contentions are correct, and acknowledging that they are predicated largely upon the defense program, the outlook for 1941 and even for 1942 points to a further advance on the road towards better business. Reduction in unemployment, higher wage rates and better sustained operating time mean greater purchasing power which, in turn, means more demand for the many items requiring paper board boxes. Commodity prices are moving upward, confirming that a better demand is in evidence, and already statistics point towards a large volume during the present year.

Bright Prospects for 1941

The effect of the European conflict upon this country is uncertain, but determination to build up our own defense is assured, with large sums already appropriated. The ever increasing burden of taxes is a heavy drag upon business recovery, but nevertheless the prospects are bright for 1941 and the paper board industry is well prepared to do its share and maintain its position among the leaders of American industry.

Scandinavian Cellulose Industry

The following information is taken from *Finansbladet*, the economic weekly of Helsingfors, Finland, dated December 13, 1940, containing statements by Director Torsten Hernod, who is one of the outstanding figures of the Swedish woodworking industry.

In a radio talk on November 13, Director Hernod states that the Swedish Woodworking Industry is suffering immensely by being practically cut off from the rest of the world. The normal production of cellulose for export is estimated at about 2,000,000 tons and as the German import in 1940 will only be between 250,000 and 300,000 tons the tonnage taken by the Germans only represents 15% of the Swedish export capacity. Chances for export to the so-called "occupied countries" like Holland, Belgium, France and Denmark, which countries in 1937 took together about 330,000 tons of cellulose involving a value in Swedish Kronor of about fifty million—all these markets are now dependent upon economic agreements or adjustments. During earlier years about 55% of the export of the Swedish sawmills has gone to England and represented in 1939 a value of about Kr. 100,000,000., whereas about 25% went to France, Belgium, Holland and Denmark. From these figures it will be seen that about 80% of the markets are entirely or partly closed.

From this same economic weekly under date of January 10, 1941 appears the following comment:

"Only 80,000 tons of woodpulp came in from Finland during the period January-September, 1940, as against 236,000 tons for the corresponding period in 1939. The decrease is one-third but in the case of Sweden the decrease is one-half (280,000 tons against 540,000 tons). During the period June-September, no pulp came in from Sweden and only 24,000 tons from Finland. The total import to the U.S.A. during the period January-September consisted of only 1,000,000 short tons, as against 1,300,000 tons the corresponding period in 1939. The import from Canada has increased enormously from 418,060 tons to 632,148 tons. The import from Europe has been considerably less and only consisted of 383,074 tons compared to 884,771 tons during the first nine months of the year of 1939."

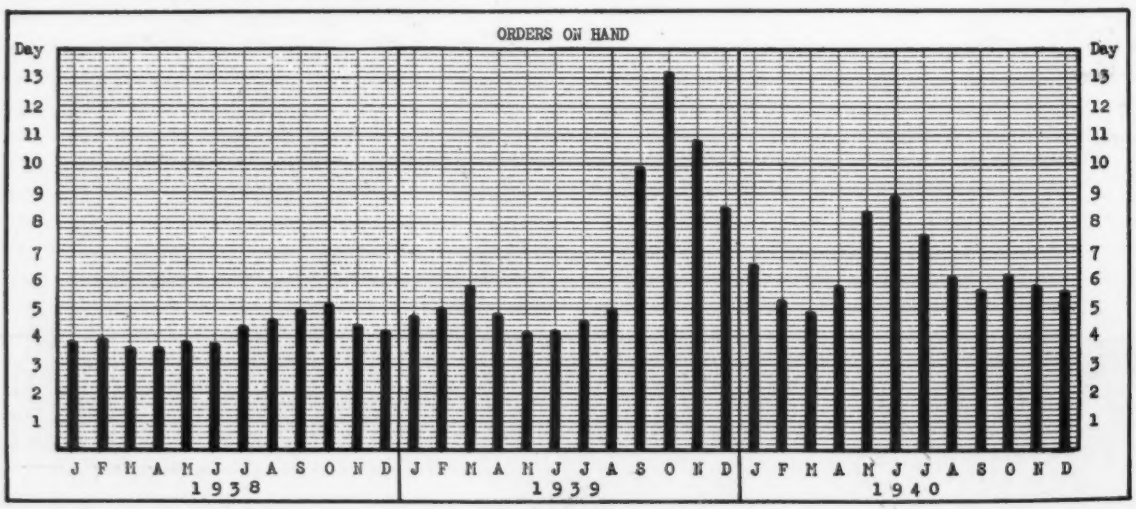
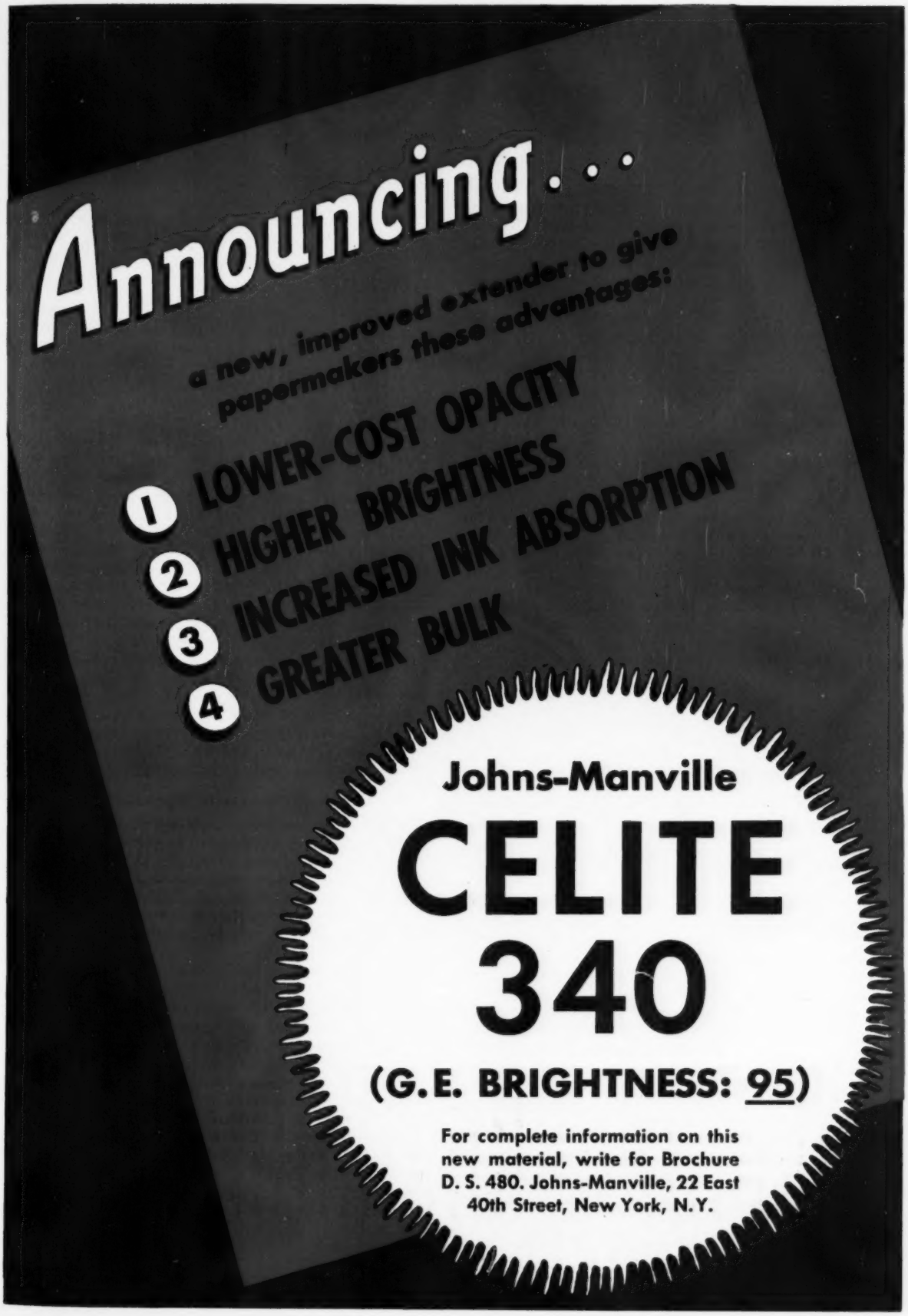


CHART V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a new, improved extender to give papermakers these advantages:
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(G.E. BRIGHTNESS: 95)
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Canadian Pulp and Paper Industry Reports High Production Year in 1940

By C. L. Sibley, Regular Correspondent of the Paper Trade Journal.

The advertisement by a Canadian pulp and paper company calls attention to the fact that pulp and paper manufacture is one of two industries which has been a vital mainstay to Britain during the past year. The other industry is gold mining. It is estimated that these two industries, through their exports, have brought into Canada during the past year between $400,000,000 and $500,000,000, in about equal proportions, a large proportion of this "new money" being in American funds, the latter in urgent demand for paying for material imported from the United States for the manufacture of munitions.

Pulp and Paper Render Vital Need

All the money has not, of course, been spent on bombers, for war materials in inconceivable variety are now being manufactured in this country, ranging from bomb fuses to battleships, and from airplanes to heavy artillery and tanks. But some idea may be obtained of the importance of the exports of the pulp and paper industry in the year by the statement that these exports would provide credit to pay for more than 2,500 bombers, or 5,000 fighting planes, or the eqivalent in other war materials. Newsprint alone, according to Charles Vining, president of the Newsprint Association of Canada, obtained something like $125,000,000 in American funds from shipment to countries outside the sterling area, and he goes so far as to say that, after gold and rubber, newsprint yields more United States dollars than any other commodity in the British Empire.

Canadian Mills Contribute to Free Press

This, however, is not the only way in which Canada's newsprint industry has been helping the cause, for Mr. Vining mentions another. He says that in sustaining a free press Canadian mills are supplying newsprint throughout the United States under conditions which enable publishers to function without fear of shortage or high cost. As to the latter, it may be mentioned here that Canadian publishers have continued into the present year the basic price of $50 per ton which has prevailed since January, 1938, notwithstanding increased costs and increased taxation. Mr. Vining estimates that in 1940 something like ten billion copies of American newspapers were printed on newsprint from Canadian mills. "Just as Canadian newsprint depends on its great American neighbor for its chief market," he says, "so do American newspaper publishers depend on Canada as their main source of supply. Between the two nations newsprint constitutes the closest material link of mutual dependence. As a necessary medium for the distribution of daily information and as an essential factor of war economy, Canadian newsprint paper affects almost every home and every family through these two democracies."

Newsprint Price and Supply Stable

Another important point which Mr. Vining brings out, of particular importance to American publishers in respect to the prospect for continuity of supply, is that in 1940, despite the increased demand caused by the drying up of imports into the United States from Europe, Canadian newsprint mills were not operated at capacity, the increased volume of production being still nearly 1,000,000 tons below the effective capacity of the Canadian mills currently in operation. Canadian newsprint shipments in 1940 amounted to 3,435,934 tons, compared with 2,861,202 tons in 1939 and a five-year (1935-1939) average of 3,003,000 tons. The effective capacity of Canadian mills in 1940 was 4,368,000 tons, leaving a margin between shipments and capacity of 933,066 tons. At the outset of the conflict the Canadian newsprint manufacturers gave their assurance that they would safeguard the stability of both the price and the supply of newsprint. As regards the price, in the United States market the price in 1940 remained at $50 U. S. funds for delivery in New York. This price, as already mentioned, has been in effect since January, 1938, and has been announced as applying through the first quarter of 1941, a period of 39 months without change. As regards supply, the Canadian mills have demonstrated their dependability by filling approximately 70% of United States demand, compared with 62% in 1939, and by meeting the suddenly increased demands of consumers in other markets when European supply became unavailable. In this latter connection, Canadian shipments to overseas markets in 1940 amounted to 657,588 tons, compared with 477,594 tons in 1939 and the previous peak of 620,000 tons in 1936.

Policy of Newsprint Manufacturers

A statement regarding their policy in the matters of price and supply was issued by the newsprint manufacturers immediately after the outbreak of war. The manifesto they published on that occasion, through the Newsprint Association of Canada, is worth repeating at this time, because it gives the wartime policy to which they are strictly adhering. Here it is:

"Having in mind the extreme conditions of newsprint supply and demand which developed during the last world war, Canadian newsprint manufacturers have asked that this statement be issued to express their attitude in the situation which now exists.

"Canadian newsprint manufacturers today realize their duty and responsibility in supplying a commodity of vital wartime importance in the dissemination of news and public information and they wish to give assurance that this realization will guide their conduct. They pledge themselves to assist, by any means within their power, the war effort of the nation.

"The Canadian newsprint manufacturers will meet the wishes of their government by avoiding any attempt to profiteer and will make every possible effort to maintain stabilized conditions of continuous supply

"Don't you dare come any closer!"

. . . SCREAMED THE BUBBLE DANCER ON PAGE 13 TO THE PORCUPINE ON PAGE 14

"I'm terribly sorry, ma'am," said the porcupine, blushing to the roots of his needles. "But don't worry about your balloon . . . I'm only *show-through* from the next page!"

"You—you *pincushion!*" exploded the dancer. "You're ruining my act!"

"And you're ruining my *reputation!*" sighed the porcupine. "You'd better tell the paper manufacturer about this . . . before my wife hears about it!"

"The very idea . . . !" spluttered the dancer.

". . . is Krebs!" broke in the porcupine. "And it's a good idea, too . . . because Krebs Pigments make even the thinnest paper opaque!"

"Wait a minute," said the dancer. "Did you say *opaque?*"

"Certainly," the porcupine said. "With Krebs Pigments you get paper so clean . . . so white . . . so *opaque* that printing stands out sharply on both sides of the page! Besides, if you have a technical problem, Krebs is always ready to help you with it!"

"That's all I want to know," said the dancer, starting off the stage. "I'm gonna get some of those Krebs Pigments for my balloon . . ."

"Just a minute, ma'am," said the porcupine, finding a comfortable spot. "We'll send 'em a letter at once!"

KREBS PIGMENT & COLOR CORP.

1007 Orange Street...Wilmington, Delaware

and to discourage methods of buying and selling which might cause a disorderly market.

"With these purposes in mind, the Canadian manufacturers strongly urge their customers to take their shipments as far as possible in equal monthly quantities, avoiding unnecessary accumulation of stocks and spot purchases which inevitably would tend to bid prices up and cause disorder.

"If normal contract methods of buying are followed, the Canadian mills believe they are in a position to assure continuous adequate supply to all customers depending upon them. Steps have been taken to guard against sabotage of Canadian plants and equipment and there is no reason to fear that Canadian production facilities cannot be fully maintained."

To the spirit of this manifesto American publishers have responded splendidly. Full cooperation has been given by the American Newspaper Publishers Association, and both demand and deliveries have proceeded normally, with an absence for a long time past of stocking up in anticipation of price increases. It can be said that relations between American publishers and Canadian newsprint manufacturers were never better than now.

Canada's Leading Manufacturing Industry

For some twenty years the pulp and paper industry has headed the list of all Canadian manufacturing industries in wages and salary distribution, in net value of production and in capital employed. This position it still holds unchallenged notwithstanding that in the returns on which it is based no allowance is made for the capital invested, the wages paid, nor for the operations in the woods which form such an important part of the industry as a whole. The woods operations are excluded from such comparisons owing to the difficulty of separating the production of pulpwood from the production of saw-logs and other primary forest products. From the standpoint of sustaining the country's balance of trade, products of forest origin have been more consistent than any other comparable group of commodities, and in the wood and paper group itself the pulp and newsprint industry has become the chief contributor, surpassing any other industry in exports. These amounted in 1940 to a combined total value of $212,296,063 (Newsprint, $151,359,496; wood pulp, $60,936,567).

One hundred pulp and paper mills operated in Canada in 1940, of which 44 were in Quebec, 38 in Ontario, 6 in British Columbia and 12 in other provinces. Of the total 27 were pulp mills, 49 combined pulp and paper mills and 24 paper mills. The total capital employed was $600,000,000, and the wages and salaries exceeded $50,000,000. Between 30,000 and 40,000 workers are directly dependent on the mills for their livelihood and many other thousands indirectly, and some 50 communities, large and small, are either wholly or mainly dependent on the industry for their existence. Of the 8,500,000 horsepower which is the total capacity of Canada's hydroelectric installations, some 2,000,000 horse-power is used by the pulp and paper industry, besides which some $8,000,000 worth of coal per annum is purchased. It pays some $50,000,000 per annum for transportation by rail and water, and purchases some $80,000,000 worth of materials and supplies, less the pulp (of their own manufacture) used by combined pulp and paper mills in the manufacture of paper.

Capacity of Newsprint Mills Averaged 78.3 Per Cent

The production of Canadian newsprint mills in percentage of capacity in 1940 averaged 78.3%, as compared with 66.8% in 1939, 62.4% in 1938, and 93.9% in 1937. The following table gives the monthly ratios for the four years:

	Annual Capacity			
	Tons, 1940	Tons, 1939	Tons, 1938	Tons, 1937
	4,367,690	4,293,361	4,204,200	3,883,000
	Monthly Production, Percentage of Capacity			
	1940	1939	1938	1937
Jan.	68.5	59.8	65.4	92.2
Feb.	65.8	60.0	62.0	91.7
March	68.5	58.6	61.0	89.1
April	73.4	63.4	56.8	90.8
May	85.1	66.4	58.7	95.1
June	89.1	66.4	57.0	95.5
July	90.8	65.3	59.6	96.8
Aug.	83.2	63.0	60.0	97.9
Sept.	83.5	72.7	68.2	99.4
Oct.	81.5	77.5	72.0	96.6
Nov.	77.1	79.7	69.3	92.7
Dec.	71.8	69.1	59.3	98.8
Year	78.3	66.8	62.4	93.9

Shipments of Newsprint

The value of Canada's newsprint exports in 1940 was $151,359,496, as compared with $115,687,288 in 1939 and $104,615,042 in 1938. The following tables, supplied by the Newsprint Association of Canada, give the comparative figures as to shipments (in tons) and destination of newsprint from Canadian mills during the past five years:

TO CANADA

	1940	1939	1938	1937	1936
Jan.	13,541	14,865	9,926	15,331	13,872
Feb.	15,223	13,582	9,453	14,965	13,129
March	15,418	15,992	12,286	20,384	14,614
April	15,793	16,371	13,306	16,542	15,983
May	12,383	15,434	15,007	18,637	17,207
June	16,496	16,155	15,164	15,659	16,359
July	15,809	15,296	12,912	17,759	15,391
Aug.	15,977	14,413	12,865	14,651	15,027
Sept.	15,255	16,443	12,973	17,629	14,147
Oct.	16,442	18,702	14,153	18,996	17,314
Nov.	15,855	15,657	15,957	21.377	19,785
Dec.	15,702	15,572	15,195	27,623	21,412
Total	183.894	189,482	159,197	219,553	194,240

TO UNITED STATES

	1940	1939	1938	1937	1936
Jan.	190,096	160,657	124,439	196,513	139,010
Feb.	164,296	140,106	115,385	189,876	162,282
March	186,788	155,642	133,933	232,240	190,662
April	196,956	177,328	157,824	253,666	201,155
May	248,229	201,503	149,642	232,128	206,314
June	253,390	173,760	141,055	236,888	187,577
July	249,252	158,770	145,318	235,138	194,623
Aug.	232,231	168,645	162,149	245,050	195,526
Sept.	218,989	213,219	171,756	240,820	206,193
Oct.	213,705	220,595	198,889	279,319	228,203
Nov.	219,524	220,469	203,646	273,985	234,894
Dec.	220,996	203,432	176,984	293,737	288,056
Total	2,594,452	2,194,126	1,881,020	2,909,360	2,434,585

TO OVERSEAS

	1940	1939	1938	1937	1936
Jan.	40,636	26,330	34,595	41,971	38,406
Feb.	31,803	24,548	38,068	28,387	41,034
March	33,098	33,465	36,468	37,088	41,261
April	54,385	20,556	43,052	38,242	38,078
May	73,829	57,698	28,639	53,499	54,159
June	68,560	42,346	52,257	51,085	44,404
July	72,447	47,677	47,260	40,774	51,882
Aug.	84,026	41,309	29,654	66,521	70,858
Sept.	49,889	37,343	45,617	42,366	47,843
Oct.	57,796	49,963	42,058	39,900	70,763
Nov.	51,360	51,743	44,818	61,878	56,233
Dec.	39,759	44,616	33,293	24,045	64,208
Total	657,588	477,594	475,779	525,756	619,129

Total Paper Production and Value

The active production of Canadian newsprint in Canada in 1940, at 3,418,803 tons, was higher than in any previous year except in 1937, in which latter

How the Experience Behind MANHATTAN Rubber Covered Rolls Compounds Economy For You

46 MANHATTAN Rubber Covered Rolls on this machine—typical of many Manhattan installations on new equipment.

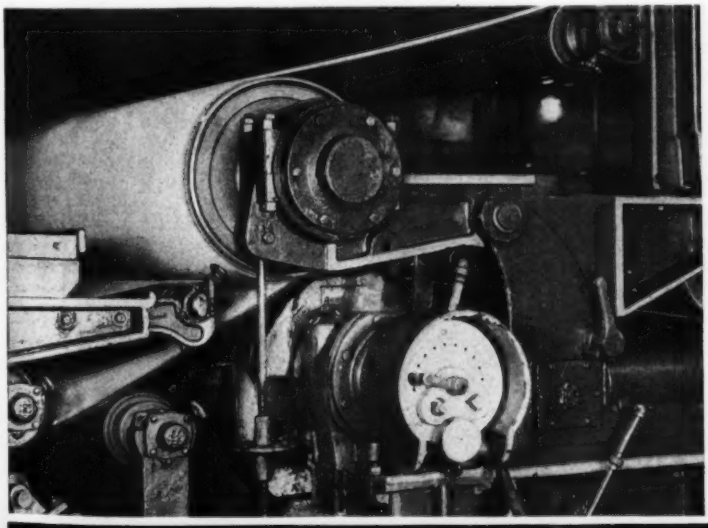
Every cent saved on water removal at extractor, suction and press rolls, cuts expense from the cost of drying.

MANHATTAN Extractor, Suction, Primary Press, Plain Press and Couch Rolls are each designed and made to meet the operating conditions they are to handle. Accuracy in grinding and finish, uniform and exact density for the required tasks, and controlled compounding, application and curing of the covering to assure complete adhesion of cover to shell for lasting service—all these are common to all MANHATTAN Rolls.

Couch and Press Rolls, because they are ground to such close tolerances and are of such uniform density, achieve a virtually perfect nip across the full length of the roll, squeezing out the maximum amount of water without crushing the felt, without pick-up or sticking and without cracking.

The paper speeds on—free, clean, unmarked, with formation and finish undisturbed; the felt rides its circuit day after day to continued production.

This service—inherent in all MANHATTAN Rubber Covered Rolls—is the fruit of 47 years' experience and it is available to you.



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Oil & Gasoline Hose	
Steam Hose	Abrasive Wheels
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year demand was stimulated by a large stocking up by publishers in anticipation of higher prices. The following tables give the production and value of the products of newsprint and other paper mills over a term of years.

Year	Quantity: Newsprint, Tons	Quantity: Other paper, Tons
1928	2,414,393	434,806
1929	2,725,331	471,818
1930	2,497,952	428,835
1931	2,227,052	384,173
1932	1,919,205	371,562
1933	2,021,965	397,455
1934	2,604,973	464,543
1935	2,765,444	515,452
1936	3,225,386	581,943
1937	3,673,886	671,475
1938	2,668,913	580,445
1939	2,926,597	673,905
1940	3,418,803	.....

	Value: Newsprint	Value: Other paper
1928	$144,146,632	$40,158,773
1929	150,800,157	42,189,095
1930	136,181,883	37,123,991
1931	114,419,637	32,210,252
1932	85,539,852	28,333,271
1933	66,959,501	29,730,374
1934	86,811,460	34,080,765
1935	91,762,201	37,316,185
1936	105,214,533	41,217,401
1937	126,424,303	49,461,120
1938	107,051,202	44,598,863
1939	120,858,583	49,928,479

Note.—In the above tabulation "other paper" includes book and writing paper, wrapping paper, paper boards, and other paper products.

Dramatic Change in Wood Pulp Trade

Because of the large quantity used in the manufacture of paper and other products in this country, the manufacture of wood pulp is an important industry, but until war came its place in the export trade was relatively small. However, a dramatic change has come over the industry in the past year, for whereas in recent years it had been exporting (mainly to the United States) around $30,000,000 worth of pulp per annum, in 1940 it exported pulp to the value of $60,936,567, part of this increase, of course, being accounted for by the increased prices which the various grades of pulp are commanding in the market.

This has meant an exceedingly busy year for most of the pulp mills, some of which have extended their facilities while certain others have been running beyond their rated capacity. In addition to this large export business, most of which has been to the United States, there has been an increasing domestic demand for pulp, which is now being used in a constantly enlarging range of manufactures.

The Excess Profits Tax

One matter which has greatly exercised manufacturers of pulp and paper during the past year is that of the application of the Excess Profits Tax, which, as the legislation now stands, applies to the pulp and paper companies equally with others. This is the first year for a long time that these companies have been able to raise their heads above water in a financial sense, and even to show some profit. It is held that to tax them 75% of these profits—that is, on all profits over and above the average of recent pre-year profits—would be grossly unfair. It is true that a Commission has been appointed to which companies may apply for a review of their cases (after taxes have been paid), but this is not regarded with favor. The President of the Royal Bank of Canada, Morris W. Wilson, recently put the matter succinctly addressing the shareholders of that Bank at the annual meeting. He said:

"There are a considerable number of industries (notably pulp and paper) which have had no appreciable profits for years. Many of these enterprises have recently enjoyed marked prosperity, and to such the full force of the Excess Profits Tax applies. It is surely unjust that those industries which, in spite of skilful management, have for years yielded no returns on invested capital, and in many instances failed to earn even bond interest, should now be penalized as compared with other industries which have steadily been earning and paying reasonable dividends but which will, nevertheless, not be liable for corporation taxes in excess of the minimum.

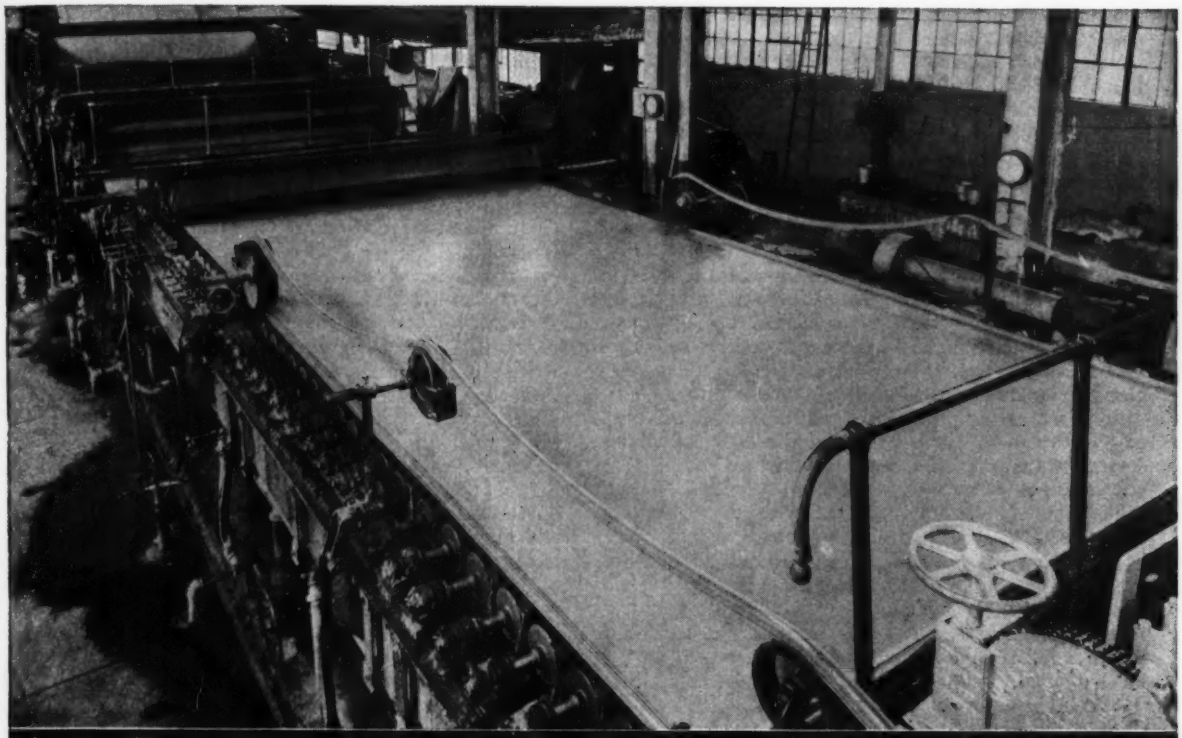
"I am aware that legislation provides that in cases where the present schedules operate unjustly the companies may pay their taxes and apply for a review of the situation, and that an able commission has been appointed to act in this regard. Excess Profits Taxes can, in my judgment, be fairly applied only after allowing for reasonable earnings on invested capital. Such allowance is made in Great Britain, where the Excess Profits Tax is 100 per cent as compared with 75 per cent in Canada. No doubt the Board of Review will apply this principle, but I am of opinion that the business community is entitled to have the situation more clearly defined by legislation. I advocate nothing that would tend to reduce total Federal corporation taxes, but I am afraid that the Excess Profits Tax is going to bear unfairly on companies that during the period of the depression have been far from prosperous, as compared with those that have all along given a reasonable return to shareholders. As the presidency of this bank is my prime business interest, and as the bank certainly does not come within the former category, I shall no doubt escape the charge of special pleading."

Meanwhile there is some talk of special measures being taken to encourage the newsprint industry because of its importance in providing foreign exchange. The establishment of new mills is frowned upon by the Provincial Governments, on the ground that over-expansion might prove disastrous after the war. Special treatment as regards writing off of depreciation and deletion reserves has been granted to war industries likely to suffer when peace comes, and it has been suggested that this might well be applied to the newsprint industry.

The Question of Pro-rating

Another problem at present much under discussion is that of newsprint pro-ration. By arrangement between the Governments of Quebec and Ontario, a system has been in operation since 1938 by which the newsprint mills of Ontario and Quebec pool their orders, so that employment may be distributed evenly among the mills, and—what is even more important—among those communities which are wholly or largely dependent on these mills.

There are certain exceptions to this policy, these exceptions being publisher-owned mills, and notably the mills of the Ontario Paper Company, which is a subsidiary of the *Chicago Tribune* and the *New York Daily News*. This company has two mills, one at Thorold, Ont., and one at Comeau Bay, Que. These mills do not compete in the open market, all their output being used by the papers published by their owners. The mill at Comeau Bay was established specially to supply the *New York Daily News*, and it is claimed that it manufactures a superior grade of newsprint specially designed for that newspaper. Recently 14 municipal authorities in Quebec, repre-



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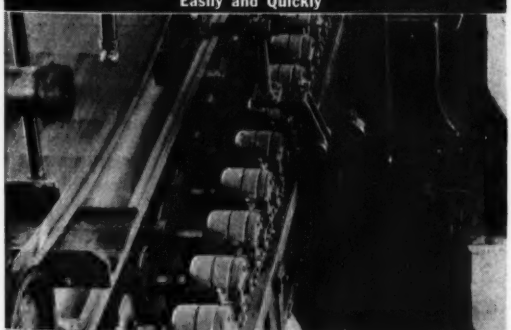

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senting newsprint communities, petitioned the Quebec Government to require that the Ontario Paper Company should submit to pro-ration. They admitted that this would not make much difference at present, since the mills in their localities are now very busy, but said that before war conditions brought this about there was much unemployment because their mills were running about half time while the Ontario Paper Company's mills were running at capacity. They held that such a condition might return with the cessation of hositilities, and called for the application of pro-rating now, so as to safeguard the future. The case for exemption has been well argued by G. T. Clarkson, official receiver for the Abitibi Power and Paper Company. In the course of evidence before a Royal Commission inquiring into affairs relative to that company, he said:

"The so-called publisher-owned capacity amounts to about 10% of the capacity of the industry, about 400,000 tons, and in dealing with proration that capacity has been excluded. In other words, you take Spruce Falls up there, 50% of their capacity is publisher-owned. They are rated at half their capacity, but the unrated parts is excluded and shipments from that part to the *New York Times* are excluded too. That condition has continued, but recently some issue has been raised in Quebec as to whether it is equitable that those mills with the publisher-owned capacity shall continue to be excluded.

"In my opinion, it is proper to exclude it, and I think I am about the only one in the industry who has that view. Nearly all the other companies are of the opinion that the publisher-owned capacity should be made subject to proration just the same as any commercial mill. I have not been able to see it that way; I have felt that if the Tribune people came over here, and put a mill in for the purpose of supplying their own requirements only, and did not go out in the commercial field at all, they should not be made subject to proration so long as they do not sell commercially.

"I do feel, however, that if, after proration came into force, any publisher-owned capacity is installed it should then become subject to proration; in other words, if they went in with their eyes open. Excepting people who have an interest in it, I think I am perhaps the only one who holds those views. The others all feel that it should be made subject to proration."

The Allied Lumber Industry

The lumber industry in Canada has a distinct bearing on the pulp and paper industry, many of the large corporations operating in both the pulp and paper and the lumber fields. During the past year there was a great revival of the lumber industry, in both export and domestic markets. The shutting off of supplies for Britain from Europe enlarged the demand for Canadian lumber while the war program in Canada created a great new domestic demand. The value of planks and boards exported in 1940 was $67,736,909, as compared with $48,835,505 in 1939.

The vast quantities of lumber used in Canada in 1940 for war purposes are indicated by the fact that nearly 5,000 wooden buildings, containing nearly 370,000,000 board feet of lumber have been erected. Millwork has been provided for nearly all of these, in addition to 1,500,000 feet of hardwood flooring, a similar quantity of edge grain western hemlock and fir flooring, and 100,000 squares of shingles. During the year the sawmill industry on the West Coast has supplied over 32,000,000 board feet of Douglas fir structural timber for the framing of 335 aircraft hangars and drill halls. This quantity, production of which caused great difficulties to the industry, is sufficient to frame a single hangar 112 feet in width and nearly 15 miles in length.

To provide machinery for dealing with possible emergencies in connection with timber supplies, the Government in June created a Timber Controller for Canada clothed with wide powers. The Controller secured the services of 27 prominent members of the lumber trade, and two members were loaned to the staff of the controller by the members of the Dominion Forest Service, as well as one by the British Columbia Forest Branch. The aim has been to achieve the necessary results by obtaining the voluntary co-operation of the lumber industry and lumber trade, and to avoid arbitrary or restrictive measures. Up to the present, according to the Timber Controller, H. R. McMillan, the co-operation requested has been forthcoming in magnificent fashion, and gives ground for hope that the tasks which the Government may require the Timber Control to accomplish in future may be done with minimum disruption of established business practice.

The main tasks confronting the Timber Control are: Buying lumber for use in Canada for war purposes; arranging for adequate supplies to Great Britain as required; encouraging export to other countries, because the urgent need for foreign exchange for war purposes makes redoubled efforts to sell lumber in foreign markets more necessary than ever; promoting economy in the use of lumber for domestic purposes, in connection with which large volumes of lumber have been saved by modifications in designs of wooden containers through action initiated by the Timber Control, notably in crating for automotive equipment, through the adoption of an open type of crate, and lastly, exercising a watchful eye on prices. In this latter connection, Mr. McMillan says, "No price control, in the usual sense of that term, has so far been exercised over the lumber trade, but increases in prices in future will have to be based on very solid grounds if they are not to give rise to difficulties. In the same way, wages must not be allowed to get out of hand, although it is recognized that in certain localities current wages are low and some increase might be justified."

Hydro-Electric Development

No review of the pulp and paper industry would be complete without a reference to the hydro-electric industry, for not only does the manufacture of pulp and paper consume by far the largest blocks of hydro-electric power, but pulp and paper corporations were the pioneers in the development of water power, and many of them are still, either directly or indirectly, owners and operators of hydro-electric installations, supplying not only their own mills but other industries as well.

New water power installations during 1940 totalled 302,790 horse-power. Adjusting this figure because of the inclusion in the 1939 totals of two installations not actually operating until after January 1st, 1940, and because of the omission of two 1939 installations not reported before the end of the year, gives a net addition to the total installation obtaining at the end of 1939 of 295,226 horse-power and brings Canada's

total hydraulic installation as of January 1, 1941, to 8,584,438 horse-power.

Much of the increase was due to additions to existing installations, but two new stations were completed and brought into operation during the year. The largest of these was in the St. Maurice Valley, Quebec, the chief centre of pulp and paper manufacture in Canada. Here, at La Tuque, on the Upper St. Maurice River, a 178,000 horse-power plant was brought into operation by the St. Maurice Power Corporation, which is owned jointly by the Shawinigan Water and Power Company and by the well-known manufacturers of pulp, the Brown Corporation. This station will provide power for the Brown Corporation's sulphate mill at La Tuque, and at the same time supplement the general distribution of the Shawinigan Water and Power Company, the chief distributor to pulp and paper mills in this region. Another large installation in Quebec Province was that of the Beauharnois Light, Heat and Power Company, which in October completed its tenth unit of 53,000 horse-power at Beauharnois, on the St. Lawrence River. The eleventh unit is planned to come into operation this month, and work is proceeding on the installation of the twelfth and thirteenth units of the same capacity.

In Ontario work is proceeding on the Big Eddy Development on the Musquash River, which will have a capacity of 10,000 horse-power. The plant is expected to come into operation in November this year. Construction is also under way on the Barrett Chute Development on the Madawaska River, which will have a rated capacity of 56,000 horse-power; this is expected to come into operation late in 1942. The Great Lakes Power Company is enlarging its hydro-electric development at Upper Falls on the Montreal River, where a second unit of 10,000 horse-power is expected to be available early this year.

Prominent among newsprint men who have entered war work are Brigadier-General J. B. White, D.S.O., and Arthur A. Schmon, B.A. The former, who served in a similar capacity in the last war, is the commander of the Canadian Forestry Corps which is carrying out forestry operations for the British Government. Mr. Schmon has been loaned to the United States Government to assist in its forestry defense program. General White is vice-president of the Canadian International Paper Company, while Mr. Schmon has long been prominent in the Ontario Paper Company, and is at present president of the Quebec North Shore Paper Company, vice-president and director of the Quebec Logging Corporation of Quebec and of the Ontario Transportation Company, as well as of allied companies. In the last war he served with the 5th Field Artillery of the American Expeditionary Force.

Another man prominent in the industry who has joined the Dominion's war effort is S. L. de Carteret, a vice-president of the Canadian International Paper Company, who has been appointed Deputy Minister of National Defense for Air. Mr. de Carteret's task will be to aid in "effecting the rapid completion of the organization" of the British Commonwealth Air Training Plan.

Descendant of a well-known Jersey Island family, Mr. de Carteret was born in New Zealand and came to Canada in 1908.

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Kraft Paper Production Surpasses Former High Mark Established in 1939

By Charles W. Boyce, Secretary, Kraft Paper Association.

The operating statistics of the kraft paper industry established new all-time high records in 1940. Improvement in the volumes of new orders, production and shipments was not of drastic nature, however, but it was uniformly higher than the record volumes of 1939. Increases of from two to six per cent were all that were necessary to bring about these favorable, and, we think, healthy results. In accomplishing this, the kraft paper industry also passed into the $100,000,000 annual sales class for the first time.

Under normal conditions the kraft paper industry is concerned primarily with domestic markets. Imports have only approached 2½% of the domestic market demand in one year. Normally, they range between 1 and 2% and are confined principally to machine glazed papers. In 1940 imports were less than two-tenths of one per cent of domestic sales. Similarly, exports have ranged between 1 and 2% of domestic volume in normal years. Because of interference of the war with exportation from European producing countries, 1940 was not a normal year, and United States exports of kraft paper increased to 4% of domestic shipments.

Total Shipments at Record Total

Total shipments of kraft paper by American manufacturers reached a record total, amounting to 104% of the 1939 volume. In adding the reduced volume of imports to these 1940 shipments and deducting the increased volume of exports, we find that domestic demand was only about 1,500 tons ahead of 1939. A new high established by such a slim margin is not impressive except that both years held at most satisfactory levels to the industry as a whole.

Kraft paper machines operated over all at an average rate of 84% of computed capacity in 1940. This compared with an 82% rate in 1939, a year in which capacities were slightly lower than in 1940. Upset world conditions caused some maladjustment among converting mills whose sources of pulp supply were badly affected. No new machines were installed during the year, but a few machines not formerly devoted to kraft were shifted to our product. Two mills with small-volume interest in kraft discontinued its manufacture.

Both Unfilled Orders and Stocks on Hand stood at higher levels at the end of 1940 than at the beginning of that year. The kraft industry normally operates against a short order file with relatively low inventories. Amounts totalling between one and two weeks' capacity suffice for the operation of the industry. Closing stocks and unfilled orders were within these normal limits in 1940.

It is impossible to review 1940 experience on a monthly basis because domestic conditions were distorted by war influences. Likewise, to compare conditions with those of 1939, similarly distorted, is of little use. The last half of 1939 was abnormal because of the buyers' panic which developed upon the declaration of war in September. The first half of 1940 was abnormal because similar conditions again developed with Germany's surprise invasion of Norway in April. The volumes in the first half of 1940 were considerably greater than those in the first half of 1939, but in the last half of 1940, they trailed off to nearer normal levels.

Future Prospects for Kraft Good

To forecast the future would require more than statistical analysis of known facts. One thing is sure that the volume of kraft consumption will bulk large throughout the duration of the war, due to the blockade of Scandinavian supplying countries and to the increasing demand as a result of the defense program. Should the war end in a truce or a German victory our Defense program would undoubtedly continue and volumes would remain high. In that event Scandinavian tonnage would probably come into the market in ever increasing quantities. Should the war end in a British victory, it is probable that not only would Scandinavian imports be resumed, but also there would be a slowing up if not complete discontinuance of the Defense program.

As we face into 1941 we can see no near term end to the present conflict. We foresee continued heavy domestic consumption of our product. We foresee probable increases in demand for exports, providing shipping facilities can be obtained. We foresee increasing uses for kraft paper in relation to defense, uses which may demand large volumes of rush supply to the exclusion of the more normal domestic demands. There is the possibility that some mills may be taken completely out of the domestic market. Such maladjustments in distribution tend automatically to panic buyers and can lead to attempts to cover for extraordinarily long periods and to speculation.

Little Spare Capacity in Industry

To meet such possibilities the kraft paper industry has but little spare capacity. As an industry which seems normally to operate at between 80 and 85% of its capacity, there is little backlog of capacity for sudden heavy requirements. New orders for the industry have already exceeded 90% of capacity during the first five weeks of the current year. This compares with a 78% of capacity position during the first five weeks of 1940. Indications are already evident for a large volume year and the Defense program has only just begun!

During 1940 the kraft paper industry was charged with violating the Sherman Anti-Trust Act. In August the industry accepted a Consent Decree and was relieved of all criminal charges. Through the Association's counsel close relationships have been established with the Department of Justice and a new program of activities has been laid out.

In January of the current year the association resigned from the business management of Stevenson, Jordan and Harrison. A new secretary and staff were employed for the conduct of association business. New offices have been set up at 122 East 42nd street, New York.

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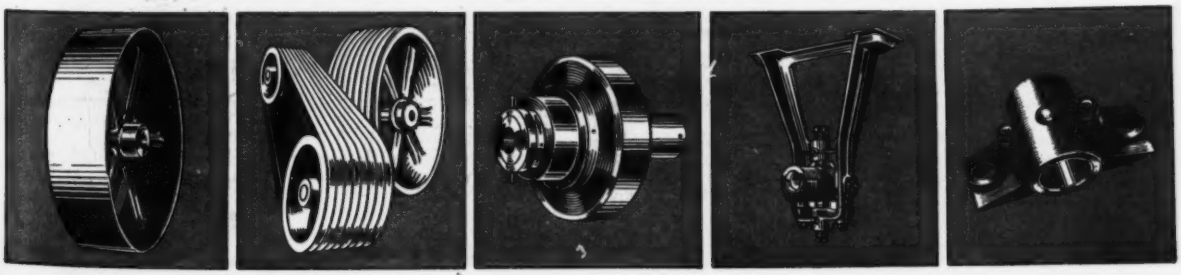

Strong Wood Pulp Market Created in 1940 By Restricted Scandinavian Imports

By O. E. Swanson, Sales Mgr., J. Anderson & Co., and the Pulp and Paper Trading Co.

After nearly 17 months of war in Europe, virtually all the interesting things predicted about that time for the pulp industry in the United States, Canada and abroad have come true, either in the entirety or in part. Observers of events are now busily engaged in endeavoring to appraise past, current and anticipated events, in order to determine, if possible, what actually did happen last year, the cause of it, and how long present conditions might continue. From then on, it is anybody's guess but, judging from present indications, there will be a brisk demand for the higher grades of American and Canadian chemical wood pulp for several years to come.

North American Production High

It is generally agreed that ever since the beginning of 1940, operations of the woodpulp industry have been at the highest level ever attained on this continent, and that prices were boosted by the great demand for chemical pulp, regardless of quality. This resulted in a record-breaking production, and consequent rise in earnings. Throughout the entire year, the pulp mills, exclusive of the groundwood mills, operated at more than 80% of capacity and if taken into consideration that about 92% of continued operation is possible for single units over short periods only, because of necessary shutdowns which reduce actual operating hours of the industry on the whole, the vast final figures on both production and earnings of last year are astonishing. In many respects, a good job was done by all, except possibly by a few un-economic mills which, like the poor, will always be with us.

Pulp Prices Rose Rapidly

Immediately following the outbreak of the war in September 1939, prices began to soar, on the assumption that Scandinavian and Finnish supplies would be curtailed, but the imports increased sensationally as the European producers rushed their choicest and undoubtedly most profitable grades to the United States. It was not until the first quarter of 1940 that incoming tonnage declined drastically. In the meantime, both prices and volume of spot business eased off somewhat until the last quarter of the year when a firmer tone and greater activity in the market again became discernible. Profound changes throughout the world have taken place in the past year, and the woodpulp industry received an abundant share thereof. Unexpected events moved so rapidly at times that certain phases were overlooked entirely but even when discovered, they were sometimes impossible to cope with in a satisfactory manner without to some extent, afflicting the trade in general.

Blockade Restricts Pulp Imports

Owing to the European war, with its severe consequences and tribulations, such as blockade, and counter-blockade, imposing drastic restrictions on business, shipping and finance, the importation of Scandinavian and Finnish Pulp became so extremely difficult that Sweden and Norway were finally forced to discontinue shipments to this market altogether. Finland, despite encountering immense difficulties, largely due to shortage of skilled labor and limited transportation facilities to Petsamo, its only open port, continued to make shipments until the end of the year but, naturally, on a greatly reduced scale. With the German invasion of Norway and Denmark on April 9 last year, the control of the Norwegian Wood pulp industry evidently passed into the hands of the invader and, with the closing of the Baltic, also due to the war, the export from Sweden, Finland and other Baltic States through this sea, to overseas markets, came to a sad but, it is hoped, temporary end. When England re-captured Narvik, Norway, there appeared to be an opportunity for Sweden and, to some extent, Finland to resume shipments to this country on a limited scale through that port. However, with its eventual re-occupancy by the Germans, this and other Norwegian trade routes were definitely closed for the time being to overseas markets. Hence, and kindly observe, for the first time since Scandinavian wood pulp was imported into the United States, contingencies beyond the control of those peaceful, law-abiding and progressive Scandinavian people made it impossible for them to carry out their obligations with regard to fulfillments of contracts closed several months prior to the war.

Lack of Import Pulp Causes Anxiety

This unfortunate situation created an acute feeling of unrest in the trade and many users of Northern European chemical pulp, who for years have become more or less dependent on it because its excellent quality had been found particularly suitable for certain purposes, hastened to procure whatever tonnage they could from available cargoes stored at various Atlantic and Great Lake Ports. By so doing, the so-called converter mills were given a breathing spell and opportunity to adjust themselves to prevailing conditions and to make gradual changes in their methods of manufacturing, in their equipment of auxiliary machinery, and to make any other required adjustments in their business. They could also prepare their customers for possible but perhaps, only slight changes in the quality of the finished products. The self sustained paper and board mills—those making their own pulp—having no such problems to contend with, were in a very fortunate and enviable position, when compared with the converter mills which, in some instances, were reported to have been obliged to pay higher prices for pulp than at which certain grades of the finished products were sold.

Great Importance of Wood Pulp as a Commodity

This is the second unprecedented situation of last year and is probably a result of that European "New Order," frequently referred to in the press of

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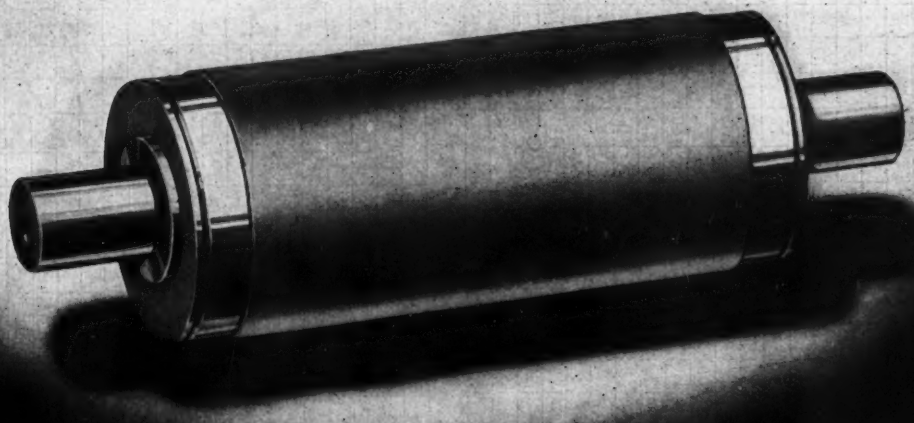

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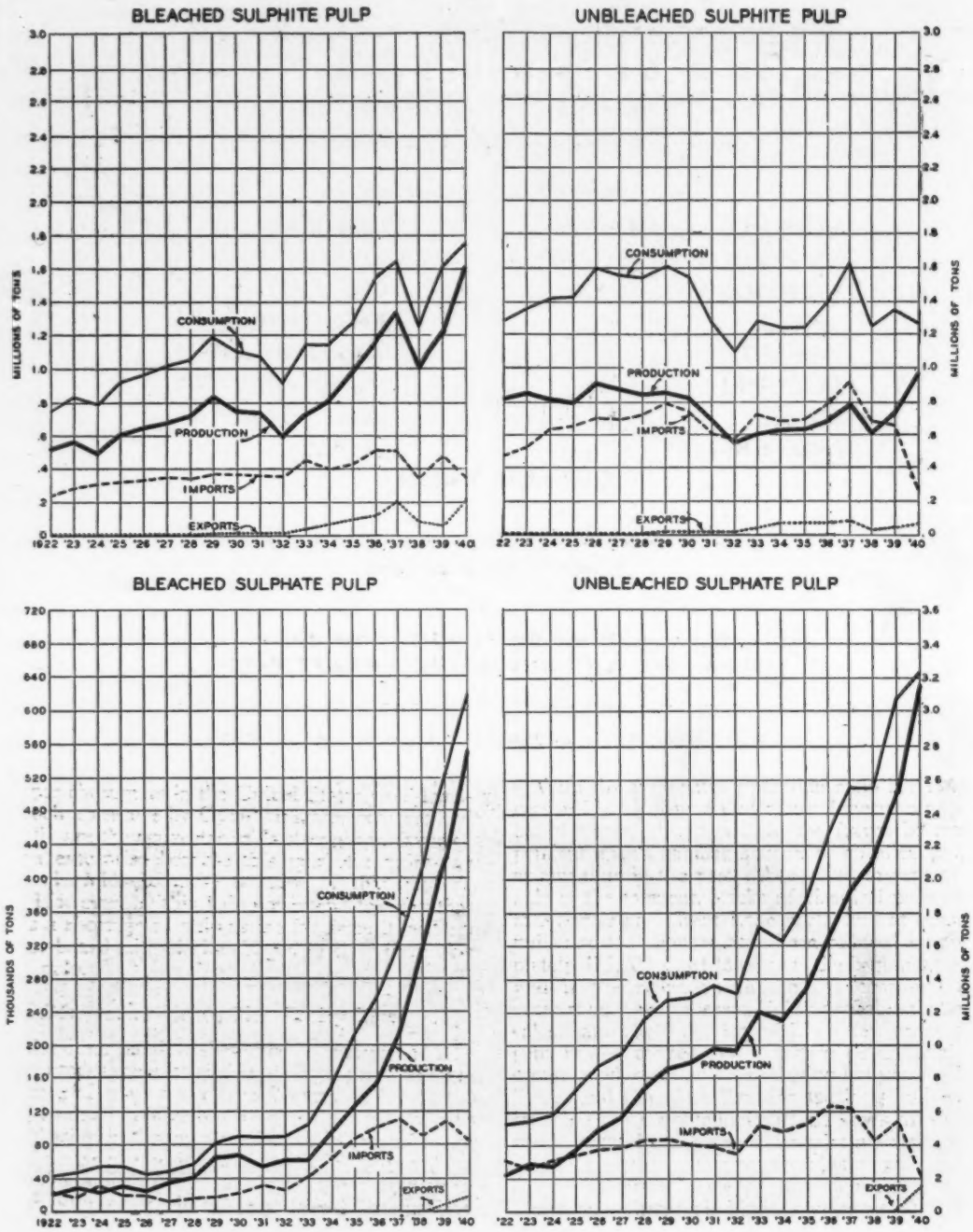

Sources: Estimated Consumption = Production + Imports − Exports
Production 1922-1939 U.S. Bureau of the Census
Production 1940 Estimated by U.S. Pulp Producers Association
Imports and Exports - U.S. Bureau of Foreign & Domestic Commerce

UNITED STATES PULP PRODUCERS ASSOCIATION

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late. When in 1690 papermaking started in the U.S. A. by Mr. William Rittenhouse in a little hand mill built of stone on the banks of Wissahickon Creek in the vicinity of Philadelphia, Pa., no one had even heard of woodpulp. Ragstock at that time and for about 190 years thereafter, was the chief raw material for papermaking but today, it is woodpulp in capital letters, not only for papermaking but for other important commodities as well, such as artificial silk, plastics, cellophane, explosives, etc. and, believe it or not, Chemical Pulp is now treated in such a way that it is even being used successfully for feeding cattle. Although woodpulp and, for that matter, paper are seldom referred to in publications outside of their own trade papers, they are, nevertheless, of vital importance to our present mode of living. Without woodpulp, very little paper could be had, and no home, church, school, factory or business could function properly today without paper.

Unbleached Sulphite Chief Bottleneck

In reality, woodpulp is so important that we just must have it and as about 95% of paper and board manufactured today throughout the world is either wholly or partly made of woodpulp, the great value of this comparatively new raw material cannot be fully appreciated by any of us. The bottleneck in the pulp industry for years has been, and still is, the insufficient quantity of North American clean Strong Bleachable Unbleached Sulphite Pulp but there are now signs, though still faint, that this situation is slowly on the way to being rectified. A leading paper manufacturer said a few months ago that if our Canadian friends would only be less "News minded," and really make a serious attempt to enter the high quality bracket of Unbleached Sulphite Pulp, they should be able to do so, without too much trouble because, among other necessities for producing such grades, they have, first of all, excellent wood, plenty of it and inexpensive enough to assure them of continued success in this field. The majority of pulp and paper consumers in the United States would welcome such a venture by Canadian manufacturers and especially are the converter mills strongly in favor of such an enterprise because this market requires an additional and substantial tonnage of this kind of pulp. However, by this I do not intend to infer that there is a shortage of pulp as is; far from it, and no paper or board mill will be obliged to close down for lack of pulp.

Converters Needs Not Easily Met

On the other hand, it should be borne in mind that several grades now available do not meet the requirements of many converter mills scattered throughout the land, and obliged to procure their pulp supply by purchasing in the open market. If those mills are to continue as a very important unit in the paper industry, they must of necessity be kept in a position to procure pulp of qualities from which competitive paper, board, etc., can be made. There is nothing intricate in this assumption, and the experience of the past year clearly demonstrates the necessity of increased production on this continent of high quality Unbleached Sulphite Pulp. "Live and Let Live" should be the slogan of the pulp and allied industries and as competition is supposed to be the spice of trade, improvements in the quality of pulp should prove advantageous to all concerned, including the ultimate users of the finished products made from higher grades of woodpulp.

Self-Sustained Mills in Strong Position

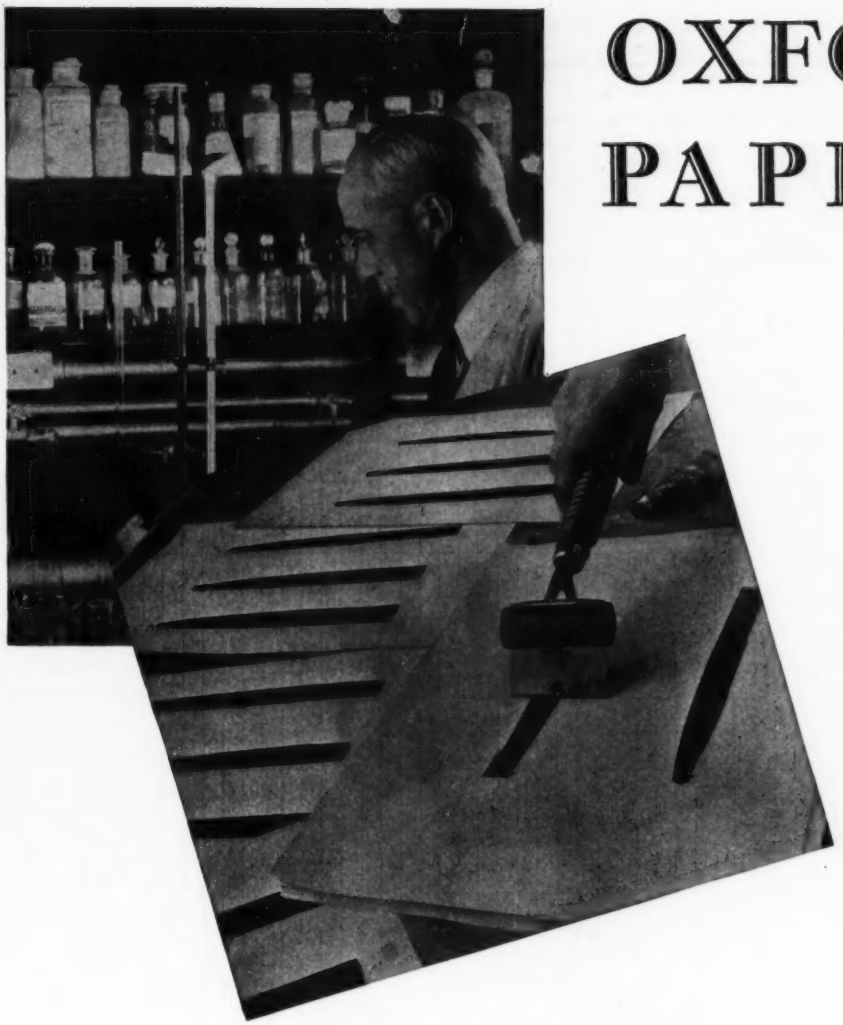
In this great country there is room for both the self-sustained and converter mills and reports indicate that the first named group of mills made plenty of money last year, but the converter mills generally did not. This marks a sharp division in the industry and unlike previous years when the big self-sustained paper and board mills had profitable years, the whole paper industry including the small converter mills prospered also, which is as it should be to my way of thinking. On account of the European war, many countries, including our own, which had formerly procured all or part of their pulp supply from Sweden, Finland and Norway and in a lesser degree from other European countries, were obliged to turn to Canada and the United States for their supplies. This new outlet for North American chemical pulp, together with our own expanding domestic consumption and export stimulated the market, and accelerated movement of pulp in all directions open to us for distribution. According to available U. S. import figures for the entire year of 1940, the combined tonnage sent here from Canada, also from Sweden, Finland, Norway and other European countries shows a large deficit difference, compared with the tonnage received during 1937, when it reached the imposing figure of approximately 2,400,000 tons. Comparative figures given elsewhere in this publication indicate that a serious situation may develop within the near future because of a possible shortage in the higher grades of Unbleached Chemical Pulp. For this reason, there should be an excellent chance for developing a profitable business by progressive North American pulp manufacturers endowed with vision and courage to expand manufacturing, and further cultivate the home market.

Growing Importance of Canadian Pulp

With the anticipated operation ratio for 1941, it is reasonable to assume that many American paper and board manufacturers will in the future be more dependent upon Canadian sources of chemical pulp than at any time in the past. According to reports available at the moment, stocks of chemical pulp on hand at Atlantic and Great Lake ports, and at consumers' mills and warehouses have been reduced by approximately 475,000 short tons since the beginning of 1940 and if the reduction in tonnage continues at the same rate, it would seem highly probable that a critical situation will develop within a few months. Ingenuity and cooperation will then be essential to increase production and distribution both in the United States and Canada. Broadly speaking and notwithstanding the large tonnage of all kinds of woodpulp manufactured on this continent, let me again emphasize that a part of our paper industry will be largely dependent upon a steady and substantial flow of Canadian pulp of all kinds, and especially those of high qualities. The quality of pulp of home origin is very satisfactory, but the tonnage available for disposal to the so-called converter mills of real good Unbleached Sulphite Pulp is insufficient to cover their requirements, because it represents a comparatively small tonnage in the aggregate.

Kraft Pulp Supply Adequate

Although the United States' production of Kraft



OXFORD PAPERS

For more than *forty years* Oxford Paper Company has, by painstaking care in manufacturing and technical research, met the most particular requirements for all book paper uses. With these papers the modern printing craftsmen will find a perfect medium of expression.

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OXFORD NORTH STAR DULL COATED
OXFORD MAINEFOLD ENAMEL
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OXFORD WHITE SEAL COATED
OXFORD COATED OFFSET (WHITE SEAL)
RUMFORD ENAMEL
RUMFORD LITHO COATED ONE SIDE
OXFORD ENGRAVATONE
OXFORD CARFAX ENGLISH FINISH
OXFORD ANTIQUE
OXFORD SUPER
OXFORD ENGLISH FINISH
OXFORD LITHO ENGLISH FINISH
OXFORD LITHO SUPER
OXFORD OFFSET
OXFORD SWIFT RIVER ENGLISH FINISH
OXFORD SWIFT RIVER SUPER
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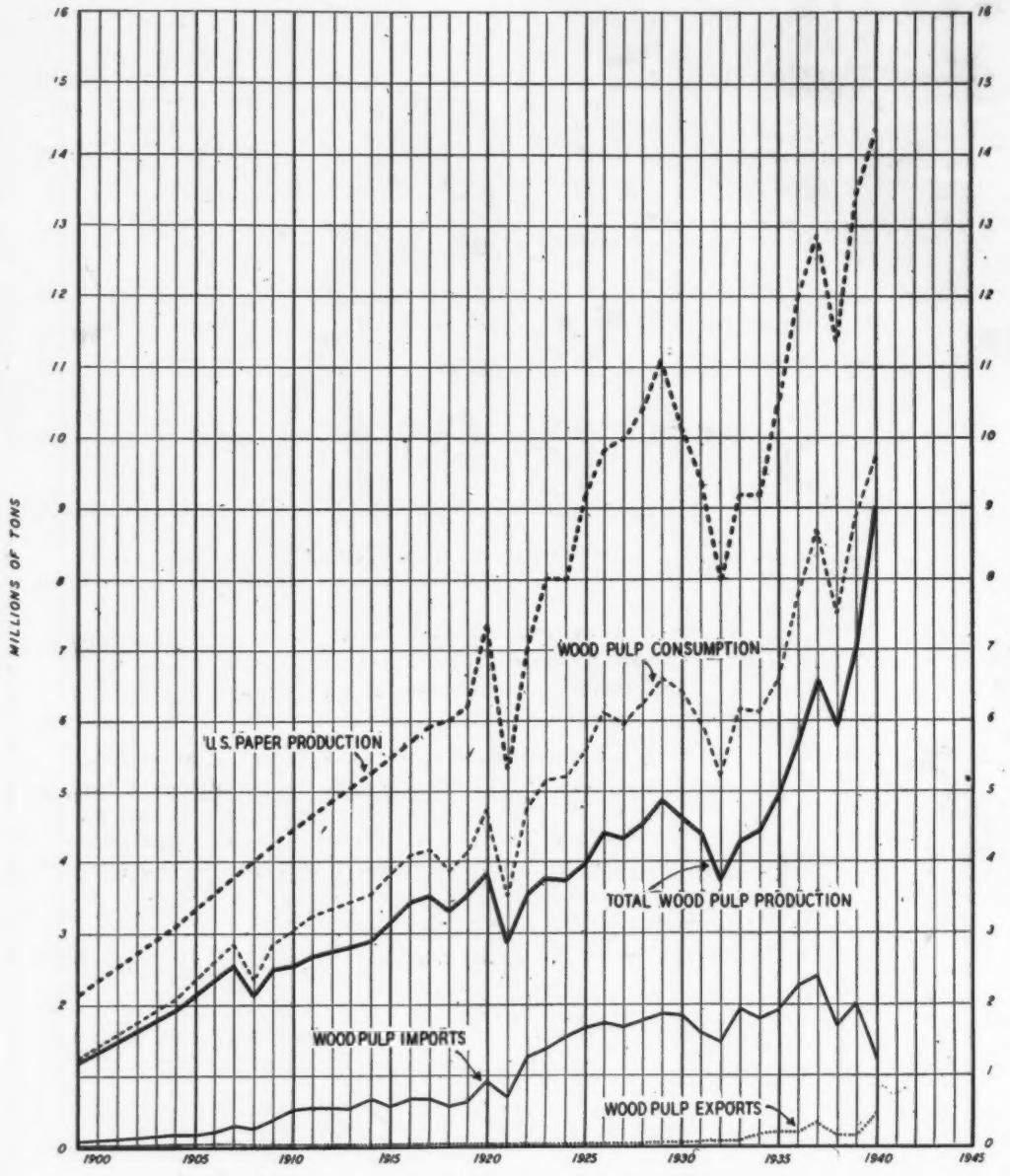
TOTAL WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS AND EXPORTS AND TOTAL PAPER PRODUCTION OF THE UNITED STATES



Sources for Paper Production - U.S. Bureau of the Census except
1924, 1926 & 1940 estimated by American Paper & Pulp Association
for Pulp Production - 1899-1939 U.S. Bureau of the Census
1940 estimated by U.S. Pulp Producers Association
Imports & Exports - U.S. Bureau of Foreign & Domestic Commerce

UNITED STATES PULP PRODUCERS ASSOCIATION

IMPORTANT

Get Copy of New, Free Map Showing Valuable Information on . . . .

TIMBER SUPPLY

. . . in the Seaboard Southeast

We Know the Good Plant Locations

Up-to-the-minute Government data shows that the Seaboard Southeast possesses an abundance of timber for all existing wood-using industries and for additional pulp mills which are expected to locate in this area.

We have just prepared a timber resources map of the Southeast, based on this data, with detailed figures on existing timber supply, annual growth, drain, net increment and other important features. The map shows several locations as offering outstanding opportunities for the establishment of additional pulp mills, and is of inestimable value to concerns interested in considering the South as a future base for pulp supply.

To such companies or individuals a copy of the map will be mailed free of cost on request.

Warren T. White, General Industrial Agent, Seaboard Air Line Railway, Norfolk, Va.

INDUSTRIAL DEPARTMENT

SEABOARD

AIR LINE RAILWAY

Pulp, both Unbleached and Bleached, has increased tremendously during the last few years, it is possible that further expansion in the south will take place. Consequently, as far as this type of pulp is concerned, there should be a sufficient supply to take care of present domestic requirements for this year at least but, as previously mentioned, the situation in good grades of Unbleached Sulphite Pulp is a horse of another color. As also intimated, the influence of general conditions throughout the world upon production and prices of pulp became exceedingly evident last year. However, to what extent, is at present impossible to determine, because the pulp trade covers such a vast territory, and is so widely scattered that it is extremely difficult to get a bird's eye view of the situation. It would seem that any expression on this matter would be based more or less upon presumption.

Cooperation Within Industry Invaluable

Like former years, 1940 received the usual stout support from various associations directly and indirectly connected with the pulp industry and also from numerous trade publications both on this side and abroad. These valuable communiques thoroughly covered, as usual, a wide field and did excellent work for the general good of the trade by supplying up-to-date information, and encouraging existing cooperation in the industry. This fine service has been so prevalent for many years past that it appears to have become a fixture in pulp circles. The Technical Association of the Pulp and Paper Industry deserves well earned mention for the fine work it has done, and is doing, and should also be given credit for its great contributions to the development of well regulated and scientific manufacturing. Through its able assistance it has become possible to eliminate the rule of thumb method. Everything from the wood pile and throughout the pulp mill is subjected to most rigid technical supervision and by the use of modern instruments and other technical appliances, qualities of pulp can be maintained with but very slight variation.

Future Pulp Prices Unpredictable

To make any attempt to forecast the duration of the present price level or what is going to happen to prices in the future would be as futile as to predict the date the war will end. Prices on spot business are easily affected and react so quickly to the slightest changes in demand that this branch of the pulp business, because of its sensitiveness in this respect, exerts very little, if any, influence on the price situation of contract business. Perhaps it would be in order to remind some folks not to overlook the fact that this administration is opposed to unreasonably high prices on raw materials, but I presume the old master of supply and demand is still an influential factor in matters of this kind. Hence it is reasonable to surmise that excessive profits on pulp will not be popular, especially if the buyers are losing money on the finished products made from the same. A situation of this kind would be apt to act like a boomerang and its repercussions would undoubtedly be drastic to the sellers—something on the order of killing the goose that laid the golden egg. Even as this is being written, it is rumored a move is on foot among paper and board manufacturers who must purchase their pulp supplies to start negotiations for lower prices, so as to enable them to compete with the self-sustained mills in their finished products. Whenever competition is eliminated, the little fellows suffer most, which story is as old as the hills. Following a period of temporary jitters regarding the price situation, it is very likely that pulp prices will be adjusted on a mutually satisfactory basis, in conformity with the level of general business activity.

Technological Progress Important Factor

For many years the knowledge and experience of Scandinavian and other European technicians were eagerly sought by North American pulp manufacturers but at the present and for some time past, our own men have advanced in the technique of manufacturing all kinds of pulp to the point where they are surpassed by none in the intricate processes of modern manufacturing. Aside from superintending the general operations of the mills, they are also capable of directing the work of the technical staffs in the laboratories and, while men of this type can be considered comparatively new, they are, nevertheless, already indispensable in the industry. According to history, our ancestors lived through all kinds of ages, of which stone, bronze and iron are the most familiar to us. When future historians refer to the present, it will undoubtedly be to the "Woodpulp Age."

Newsprint Continues Expansion

Production of newsprint in Canada during January 1941 amounted to 261,298 tons and shipments to 243,394 tons, according to the Newsprint Service Bureau. Production in the United States was 89,124 tons and shipments 84,141 tons, making a total United States and Canadian news print production of 350,422 tons and shipments of 327,535 tons. During January, 32,074 tons of newsprint were made in Newfoundland, so that the total North American production for the month amounted to 382,496 tons. Total production in January 1940 was 367,203 tons.

The Canadian mills produced 10,266 tons more in January 1941 than in January 1940, which was an increase of four and one-tenth per cent. The output in the United States was 4,998 tons or five and nine-tenths per cent more than in January 1940, in Newfoundland production was 29 tons or one-tenth of one per cent more, making a total increase of 15,293 tons, or four and two-tenths per cent more than in January 1940.

Stocks of newsprint paper at the end of January were 170,275 tons at Canadian mills and 18,438 tons at United States mills, making a combined total of 188,713 tons compared with 165,826 tons on December 31, 1940, and 192,380 tons at the end of January 1940. During the winter some tonnage is accumulating at points from which water shipments will later be made.

Venezuela Imports More Paper

[FROM OUR REGULAR CORRESPONDENT]

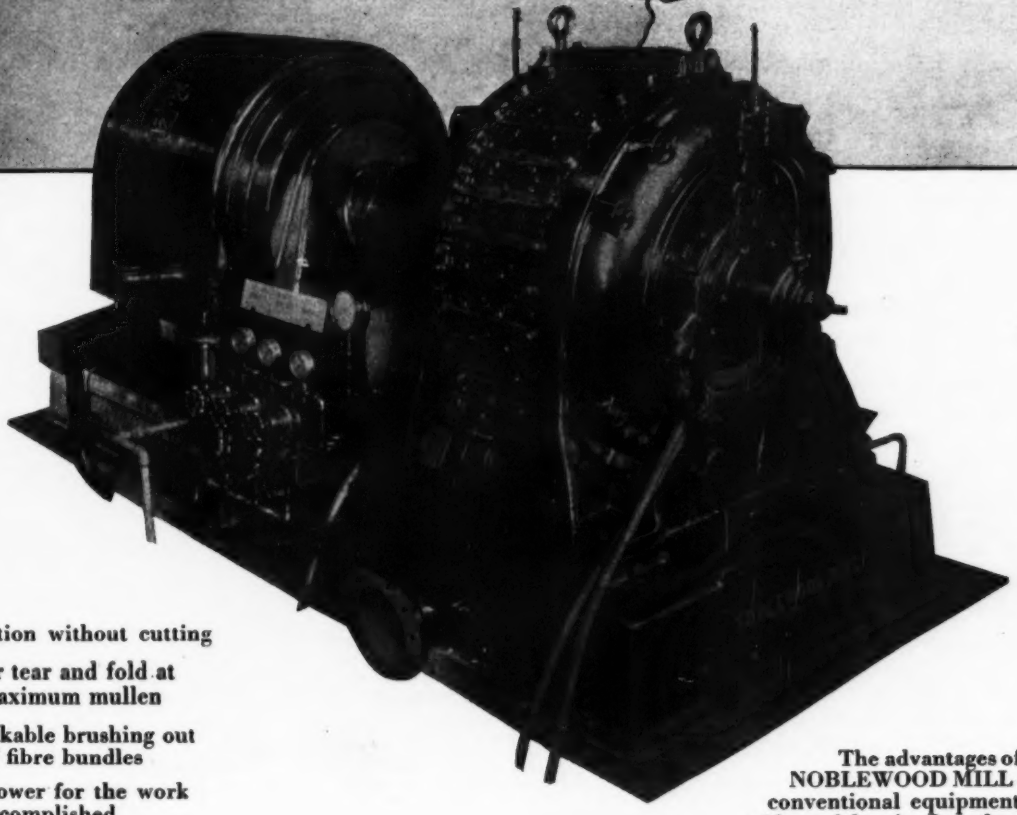
WASHINGTON, D. C., February 17, 1941—The two paper mills in operation in Venezuela produce sufficient wrapping paper to satisfy normal requirements of this market. Other types of paper are not produced here and accordingly there is a good demand for imports, which at present are coming almost exclusively from the United States. Imports of paper into Venezuela during 1937 (the last pre-war year) totaled 4,472 short tons, of which United States supplied 2,674 tons and Germany 1,106 tons.

The NOBLEWOOD MILL

(A Superior Pulp Preparation Unit)

Installations in

North Eastern United States
and Canada



Hydration without cutting

Higher tear and fold at maximum mullen

Remarkable brushing out of fibre bundles

Low power for the work accomplished

Full control of treatment

Continuous operation

The advantages of the NOBLEWOOD MILL over conventional equipment are evidenced by the fact that five users have already reordered additional units.

Write for booklet P.T.2 describing the principles of operation and construction of the NOBLEWOOD MILL.

THE NOBLE & WOOD MACHINE CO.

Pulp and Paper Mill Machinery

HOOSICK FALLS, N. Y., · U. S. A.

Consumption of Paper Making Chemicals Rose to New High Level in 1940

Written Especially for the Annual Review Number of the Paper Trade Journal.

The consumption of chemical by the paper and pulp industry in 1940 exceeded the high rate of 1939, despite the higher rate which occurred in the last quarter of 1939. Price fluctuations were relatively small.

Casein

Casein production during 1940 continued its downward trend, and the production for the year was estimated at 35 million pounds. Production in 1937 was reported as 67,467,000 pounds; 1938, 48,549,000 pounds; 1939, approximately 42,000,000 pounds.

Prices during the year did not fluctuate as much as in 1939. The average price for the year was around 12 cents per pound, and varied from a low point of 10½ cents to a high of 15 cents during the year. Importations from the Argentine are estimated at 25 million pounds, which is a considerable increase over 1939.

It is generally believed that prices in 1941 will range somewhat like 1940, although, if consumption increases, it is quite possible that the average price for 1941 will be somewhat higher than in 1940, as during war times the trend is toward human consumption milk products, rather than such a commercial product as casein.

Rosin Size

Due to the abundant supplies of rosin, the price range for rosin, and therefore, rosin size, was relatively lower in 1940 than in 1939. On July 1, 1940, the method of selling rosin was changed from so-much per trade unit of 280 pounds gross, to a 100 pounds net weight basis. There is little likelihood of any pronounced increase in the price of rosin during 1941, unless something unforeseen happens, as stocks are large and lack of exports will continue to keep stocks that way. A sudden ending of the war would probably have at least a temporary effect, and would, in the long run, have a tendency to firm up the market.

China Clay

Consumption of china clay in 1940, was at a relatively high rate. Prices remained firm. It is expected that prices will continue about the same in 1941.

Sulphate of Alumina

Demand for sulphate of alumina during 1940 was good. Prices were firm during the entire year. It is somewhat uncertain as to how prices will be affected in 1941 by the re-armament program. Logically, with the very heavy demand for sulphuric acid and increased freight rates on sulphur, sulphuric acid may increase in price, and the supply may become somewhat scarce.

This may indirectly have a firming effect on the price of sulphate of alumina during 1941, and until the present emergency passes.

Salt Cake

Production of both natural and synthetic salt cake increased during the year 1940, and while demand was quite heavy throughout the entire year, prices remained firm and this condition is expected to continue in 1941.

Argentina Produces More Paper

WASHINGTON, D. C., February 17, 1941—Data issued by the Argentine Government Statistical Office covering 1939 manufacturing operations disclose some interesting features. In general, they indicate an increase in local production of paper and paperboards. Four additional establishments are reported, bringing the total now up to 35. Another feature of interest is the increased consumption of domestic pulp. The principal increase is in straw pulp, manufactured by Celulosa Argentina, S. A., Juan Ortiz, F.C.S.F. Domestic production coincides closely to consumption and the consumption figure of 20,944 metric tons for 1939 represents an increase of more than 6,000 tons compared with the preceding year. The consumption of domestic mechanical wood pulp has also doubled from 1,220 tons to 2,408 tons. This mechanical wood pulp is produced by the same company in its plant established at Zarate on August 12, 1938.

The 1939 figures showed considerably heavier imports of chemical pulp than those for 1938 and the reduction of imports of mechanical pulp were compensated by increased consumption of the domestic product. By the end of 1939, the local paper industry already encountered considerable difficulty in obtaining supplies of pulp, and contrary to the general practice prior to the war, numerous purchases were made in the United States.

Total production of paper increased from 79,035 tons in 1938 to 86,033 tons in 1939, approximately 9%. Cardboard and paper board increased from 21,898 to 26,619 tons, approximately 21%. One item that has undoubtedly increased considerably is corrugated cardboard. The small reduction registered in total tonnage of articles manufactured from paper and board probably reflects the less favorable economic conditions of the latter part of the year. All in all, however, the total tonnage increase of 10% for all paper, cardboard and converted products, corresponds very closely to the increase in total value of these products.

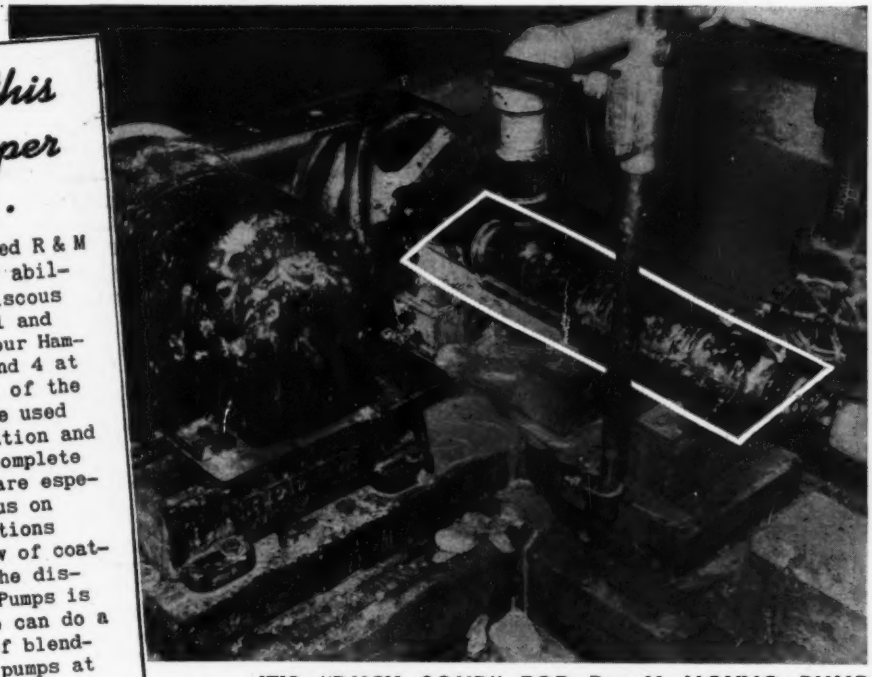
Northern Kraft Corp. Expands

The Northern Kraft Corporation, Howland, Maine, has installed and placed in operation a new four ton digester, bringing its total number of digesters up to five. The company also is installing a new Rogers' wet machine. The changes have increased the company's production to 80 tons daily of No. 1 Northern sulphate pulp, a large percentage of which is being shipped to the Gilman Paper Company of Gilman, Vt.

16 R & M MOYNO PUMPS
for Champion Paper & Fibre Company

Read what this Leading Paper Mill says...

"We originally selected R & M Moyno Pumps for their ability to handle very viscous and abrasive material and are now using 12 in our Hamilton, Ohio, plant and 4 at Pasadena, Texas. All of the pumps at Hamilton are used on a coating application and are working to our complete satisfaction. They are especially valuable to us on some of the applications where a metered flow of coating is necessary. The displacement of Moyno Pumps is so positive that we can do a very accurate job of blending by running the pumps at predetermined speeds."



IT'S "DUCK SOUP" FOR R & M MOYNO PUMP
Tough working conditions mean nothing to the R & M Moyno Pump. Here's one of four in the "thick" of production at Champion's Pasadena, Texas, plant.

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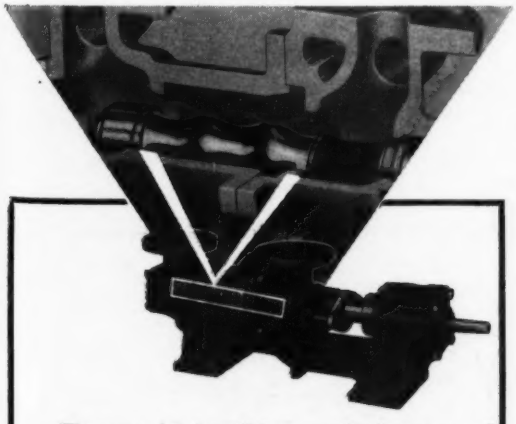
CHAMPION echoes the endorsement given the R & M Moyno Pump by leading paper mills everywhere. The R & M Moyno is the proved and profitable answer to *your* pumping problems.

It resists the wear of heavy, abrasive liquids... handles coating solutions up to 53% solids, delivering a uniform discharge at constant pressure without agitation or cavitation.

Investigate the R & M Moyno Pump today. There's an R & M field expert at your service, ready to give you the answer to your problems—yes, an answer that may save you thousands of dollars. For further details write today for R & M Moyno Pump Folder No. 1777.



The secret of the efficient, trouble-free performance of the R & M Moyno Pump is in the pumping action of the helical rotor and stator. Action is like that of a piston moving in one direction through a cylinder of infinite length.

ROBBINS & MYERS, Inc.
MOYNO PUMP DIVISION SPRINGFIELD, OHIO

Paper Week in New York Is Big Success

J. L. Riegel Is Reelected President At Sixty-Fourth Annual Convention of American Paper and Pulp Association At Waldorf-Astoria Hotel—Numerous Affiliated Associations Hold Meetings.

The Sixty-fourth annual convention of the American Paper and Pulp Association and its numerous affiliated associations was held at the Waldorf-Astoria Hotel, February 16-20 inclusive.

The principal opening event was the luncheon meeting held at 1 P. M. on Monday. J. L. Riegel, president addressed the meeting as follows:

Gentlemen:—For several years the American Paper and Pulp Association has held an afternoon meeting during Convention Week, at which reports were presented and addresses were made on subjects of general interest to the industry.

The executive committee and Board of Governors thought it desirable this year to have this luncheon meeting instead, devoted to better acquainting the industry with Association affairs, and with the value to be derived from stronger support of its activities.

I am not going to give you a detailed report of the past years activities. These were largely covered in an annual report sent you last month, and well worth studying.

Instead, I am going to tell you what has impressed me most about the association during the past year. You will appreciate that when you honored me by electing me president of the association I had the fresh viewpoint which most of you would have.

I want to speak first about the staff of the American Paper and Pulp Association. A very large part of the work of running the association falls on the secretary. Mr. Tinker has done that work remarkably well—the industry has realized it, and has encouraged him, given him their confidence and their constructive criticism.

I have been most anxious that the whole central organization be placed on as effective and economical a basis as is possible. Mr. Tinker and I with the help of many others have examined the work that was being done, eliminating what seemed unnecessary and assigning specific duties to the various staff members.

For better organization, it seemed wise to define the work of counsel; a special committee was appointed to assist in this and to fix a fee for counsel commensurate with the work they are to do.

I believe that the central organization of the Association is on an effective and economic basis today, and we are striving to further improve it.

The association is in good shape financially. Expenditures for the year were $2,000 less than called for in the budget. A surplus was accumulated during the year of $23,000, bringing the total surplus to $25,000. This gives the Association a safe working balance with a reserve of $20,000 in Government bonds and about the same amount in cash.

For next year the finance committee this morning recommended a budget with expenditures $11,000 less than last year, assessments less by $23,000, and a reduction of the assessment rate from 46 cents in 1940 to 39 cents in 1941 per thousand dollars of sales.

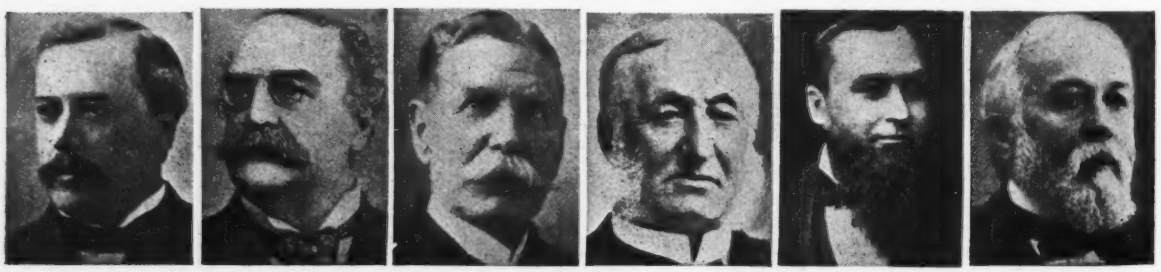
This rate could be reduced much further if all mills eligible would support the American Paper and Pulp Association. Because the American Paper and Pulp Association grants no memberships to individual companies but derives its support from the Divisions it goes without saying that the Executive Committee believes that support of the Divisions and the A. P. & P. A. should go hand in hand.

I want to make sure that all of you clearly understand the set-up of the American Paper and Pulp Association and realize its advantages. The central organization deals with general industry problems, particularly those affecting the relations of the industry with the Government. The Divisions deal with problems related to the specific products of their particular branch of the industry.

I do not question that an individual mill may disagree completely with some policy of the association, but that does not relieve the mill of its obligation to strengthen the position of the paper industry by supporting the American Paper and Pulp Association.

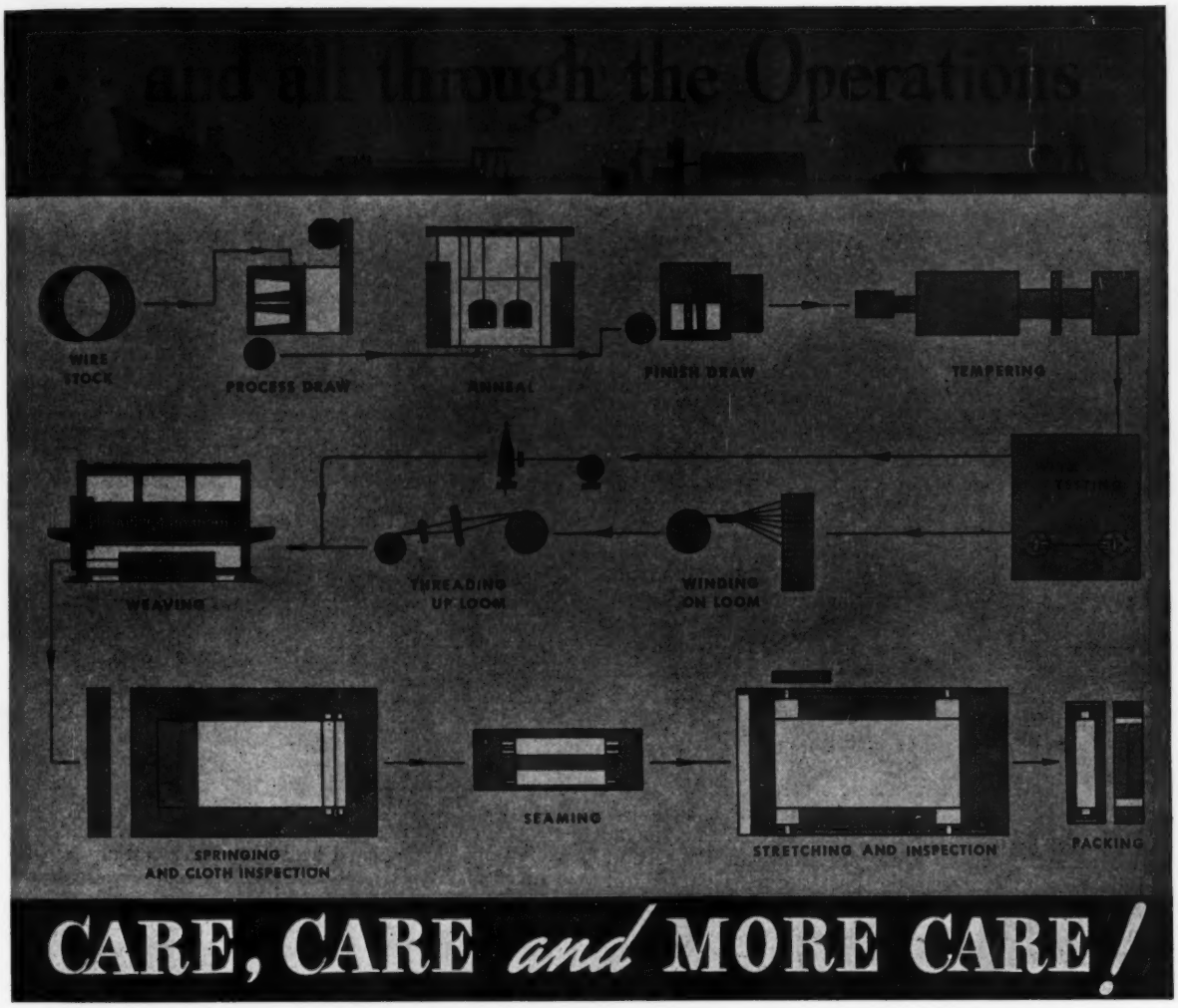
When a mill does disagree with an association policy the Executive Committee and the staff welcome constructive criticism for they realize their responsibility in planning policies that will be for the greatest good of the industry.

OFFICERS, PAST AND PRESENT, OF THE AMERICAN PAPER AND PULP ASSOCIATION



WILLIAM WHITING | WELLINGTON SMITH | J. W. FRENCH | W. H. PARSONS | BYRON WESTON | E. C. ROGERS

William Whiting, Pres., 1878-80. Wellington Smith, Pres., 1880-83; Vice Pres., 1879-80. J. W. French, Pres., 1883-84; Vice Pres., 1896-98. W. H. Parsons, Pres., 1884-86. Byron Weston, Pres., 1886-88. E. C. Rogers, Pres., 1888-90; Sec.-Treas., 1886-88.



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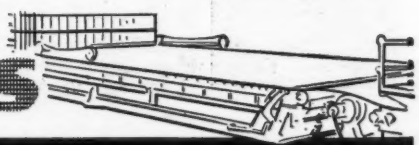
From beginning to end, the making of wire cloth at Lindsay is under close laboratory control.

Every Fourdrinier or cylinder wire moves through its cycle at Lindsay on the principle that there can be no "back-tracking" to recapture quality. You cannot neglect a detail and trust to "make up for it" later in the manufacturing process. Every step must contribute a sure, fixed something to a standardized progress. Laymen are surprised at the number of men assigned to certain operations; at the great precaution used, for example, in rolling up and boxing; at the ever-growing volume of technical data we accumulate, interpret and apply . . . The wire cloth manufactured by our industry in 1941 must be better than that which was produced in 1940.

THE LINDSAY WIRE WEAVING COMPANY

"Serving the Paper Industry since 1903"

14001-14299 ASPINWALL AVENUE • CLEVELAND, OHIO



Lindsay **WIRES**

FOR PAPER MILLS

OFFICERS, PAST AND PRESENT, OF THE AMERICAN PAPER AND PULP ASSOCIATION

W. A. Russell | Warner Miller | A. G. Paine | G. F. Perkins | H. J. Chisholm | P. C. Cheney

W. A. Russell, Pres., 1890-02. Warner Miller, Pres., 1892-94. A. G. Paine, Pres., 1894-96; Vice Pres., 1891-94. G. F. Perkins, Pres., 1896-97. H. J. Chisholm, Pres., 1897-99; Vice Pres., 1891-96. P. C. Cheney, Pres., 1899-1901.

For eight years, at least, this country has moved with the world-wide tide toward stronger central government. The war situation has accelerated this.

It is absolutely essential for an industry which wishes to best meet this situation to have a strong central organization. The paper industry has long realized the necessity of this and built the American Paper and Pulp Association. The Association's standing, its statistics, and its long background of sound relations with the Government are of inestimable value to the industry. I want to urge each mill to give full support to the American Paper and Pulp Association.

Address of E. W. Tinker

The following report was presented by E. W. Tinker executive secretary of the association:

Mr. Riegel has requested that I report to you at this time the activities of the American Paper and Pulp Association over the past year. This request was, I believe, inspired by a general criticism in the industry that it was not informed sufficiently concerning the work of the Association and its necessity from an industry standpoint.

I have acted in the capacity of executive secretary of the association for one year. Let me make it clear that before accepting the position and undertaking the responsibility I was careful to assure my self of two particular things: first, that the activities of the Association were beyond question within the scope and the intent of the law and definitely in the public interest; secondly, that there was a worth while job to be done for the industry, fully justifying the comparatively small expenditure required. In both instances, so far as it was humanly possible to assure myself, you will understand that I was fully satisfied. However, this is only background and I should now like to describe briefly the more important of the Association's activities during 1940.

Relationship With National Defense

Among the major, non-recurring activities that have engaged the attention of the Association has been the active relationship of the industry to the National Defense program. At the outset, contacts were made with the National Defense Advisory Commission to determine how the industry might best cooperate. As a result of the relationship established, thanks particularly to the very constructive attitude of T. B. McCabe, the association took part in the joint preparation of a careful analysis of the pulp supply situation with the chief purpose of determining the adequacy of this supply under the radically changed conditions that existed because of the cutting off of European supplies. Subsequent meetings were held with representatives of the Defense Advisory Commission to discuss the findings of this report and, conjunctively, the price situation that had developed as a result of the impact of the war in Europe. I think it is fair to state that out of these discussions grew a pattern that has since been generally adopted in dealing with similar problems in other industries. Since that time the association has prepared a report covering paper, including not only capacity for production of an adequate supply to meet normal national demands, but additional demands as well, and indicating the importance of the paper industry to our national life and to national defense needs. This report has been accepted by the National Defense Advisory Commission, after review by cooperating agencies,

OFFICERS, PAST AND PRESENT, OF THE AMERICAN PAPER AND PULP ASSOCIATION

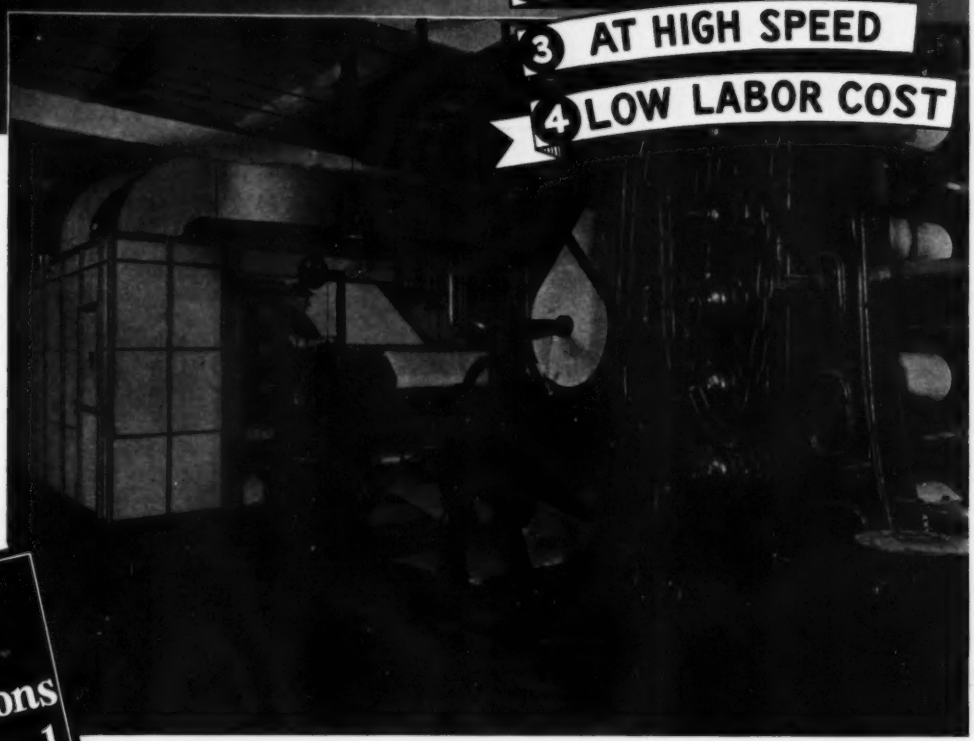
A. C. Hastings | G. W. Knowlton | W. N. Caldwell | D. S. Cowles | F. L. Moore | A. B. Daniels

A. C. Hastings, Pres., 1901-03; 1909-14. G. W. Knowlton, Pres., 1903-05; Vice Pres., 1901-03. W. N. Caldwell, Pres., 1905-07; Vice Pres., 1901-03. D. S. Cowles, Pres., 1907-09; Vice Pres., 1905-06. F. L. Moore, Pres., 1914-16; Vice Pres., 1916-18. A. B. Daniels, Pres., 1916-18; Vice Pres., 1906-08.

ANNOUNCING ROSS CYCLE CONDITIONER

FOR PRECONDITIONING PAPER...

1. UNIFORMLY
2. CONTROLLABLY
3. AT HIGH SPEED
4. LOW LABOR COST



Four installations have proved

. . that it adds moisture entirely from controlled vapor—no water spray or roll condensation.

. . that it is readily adaptable to synchronism with supercalender, embosser, cutter or rewinder.

. . that it is already recognized as a most important new development in assuring better, faster, more economical paper preconditioning.

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G. W. Sisson, Jr. W. J. Raybold H. W. Stokes N. W. Wilson D. C. Everest S. L. Wilson

G. W. Sisson, Jr., Pres., 1918-21. W. J. Raybold, Pres., 1921-23. H. W. Stokes, Pres., 1923-25; Vice Pres., 1921-23. N. W. Wilson, Pres., 1925-27; Vice Pres., 1923-25; 1933-41. D. C. Everest, Pres., 1927-29; 1937-40; Vice Pres., 1925-27; 1933-37; 1940-41. S. L. Wilson, Pres., 1929-35; Vice Pres., 1927-29; 1935-38.

and it is hoped will be of value not only in connection with national defense developments but in considering the priority rating of the paper industry, as necessity forces the establishment of industrial priorities.

The Association cooperated with the industry representatives appearing before the Wage and Hour Administration in its consideration of the minimum wage for the primary pulp and paper industry. This cooperation took the form of planning and organizing the industry's presentation, and the furnishing of pertinent statistical information relating to the minimum wage situation in the primary industry.

Cooperation With Wage-Hour Administration

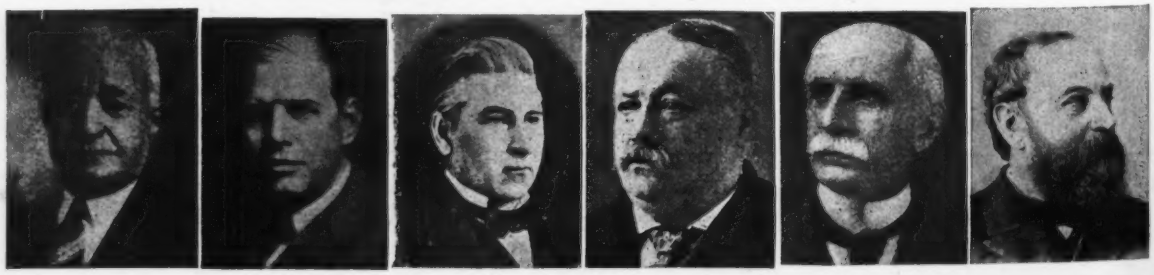
The presentation of evidence before a trial examiner of the Wage and Hour Administration, in an attempt to clarify the definition of executive, administrative, professional and outside salesmen in the industry, was accomplished in cooperation with the National Association of Manufacturers and the Committee on Manufacturing of the American Paper and Pulp Association. The importance of this decision is well known to all of you.

The fact that the association has been able to obtain promptly, decisions of the Wage and Hour Administrator, and when necessary, interpretations of these decisions and keep the industry currently informed, has, I hope, been of real value to the industry and prevented difficulties that would inevitably have arisen in individual company cases, regardless of the best intent. This activity continues of current importance.

During the past year the association, through a cooperative arrangement with the Forest Products Division of the Bureau of Foreign and Domestic Commerce, has been able to keep the industry currently informed of the trend of events in Scandinavian countries and in Europe in general, relating to both the pulp and paper industry. Because of the specific relationship of the domestic industry to the foreign situation, it was thought that current information of this kind would not only be of general interest but would be of real value to individual companies in determining policy and in planning future courses. I sincerely hope that this has been the case.

At the instance of the President of the United States, a Joint Congressional Committee was appointed in 1938 to study the forest conservation problem of the United States. The final report of this committee has not yet been made available. However, there is little doubt but that it will deal specifically with pulpwood supplies, so vital to the industry, and will make direct recommendations pertaining thereto. In making presentations to this committee, both the Secretary of Agriculture and the acting chief of the Forest Service, recommended Federal regulation of all cutting operations on private forest lands, which recommendation the industry in general opposed as contrary to both public and industry interest. In this particular case, verbal presentations as well as an exhaustive report covering the situation, were presented to the Committee for its consideration. The Committee report containing recommendations to the Congress, which will ultimately take the form of suggested legislation, will undoubtedly be available by May first of this year.

OFFICERS, PAST AND PRESENT, OF THE AMERICAN PAPER AND PULP ASSOCIATION



F. J. Sensenbrenner J. L. Riegel A. E. Harding C. D. Brown J. A. Kimberly C. M. Smith

F. J. Sensenbrenner, Pres., 1935-37; Vice Pres., 1915-17; 1934-35; 1937-40. J. L. Riegel, Pres., 1940-41; Vice Pres., 1934-40. A. E. Harding, Vice Pres., 1882-83. C. D. Brown, Vice Pres., 1884-91; 1898-99. J. A. Kimberly, Vice Pres., 1884-85; 1890-91. C. M. Smith, Vice Pres., 1884-90.

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●

Consistency on opposite three charts were kept within better than ± .05%.

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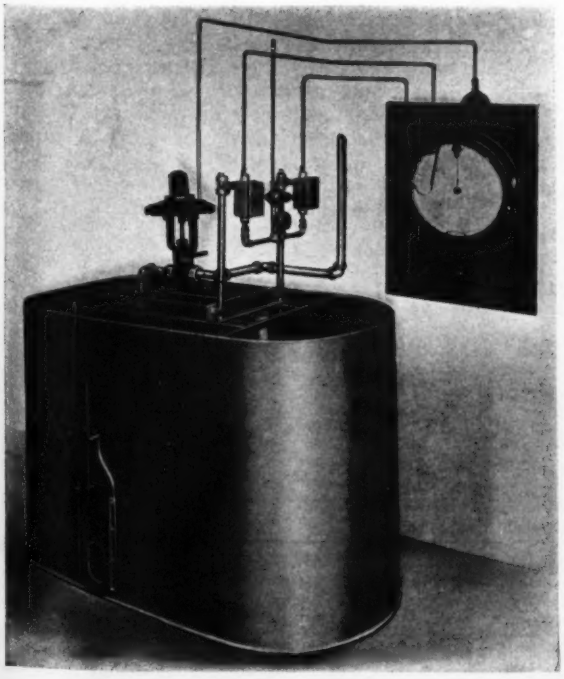
Instrument by Foxboro.



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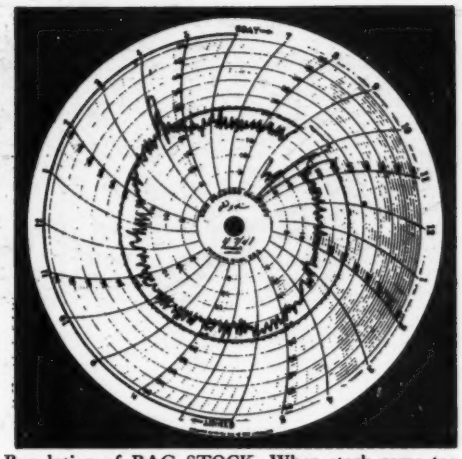
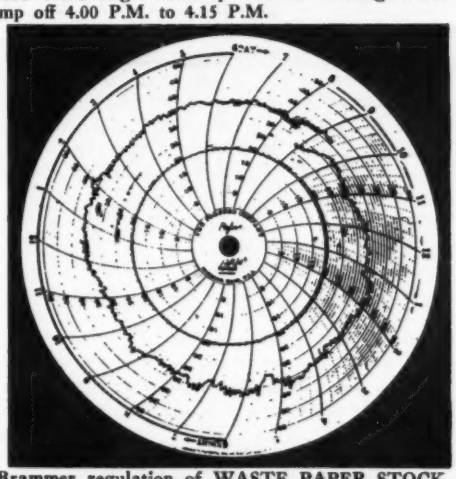
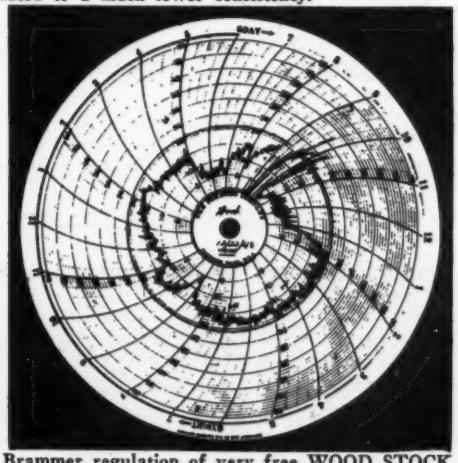


Regulation of RAG STOCK. When stock came too low, 10.15 A.M., valve closed entirely and consistency dropped below that required. Consistency increased, 4.00 A.M., valve opened fully, yet consistency continued increasing. Check-up showed diluting water pump off 4.00 P.M. to 4.15 P.M.



Brammer regulation of WASTE PAPER STOCK, diluted to a much lower consistency.



Brammer regulation of very free WOOD STOCK. Diluting water pump trouble, 9.00 A.M. to 10.15 A.M., caused considerable variation of consistency.

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C. T. Crocker, Vice Pres., 1885-86. C. A. Dean, Vice Pres., 1885-86; 1899-1901; 1906-07. C. H. Harding, Vice Pres., 1886-88. M. B. Mason, Vice Pres., 1886-90. N. T. Pulsifer, Vice Pres., 1888-89. O. C. Barber, Vice Pres., 1889-96.

Association Backs Stream Pollution Acts

The association gave its endorsement and support to constructive stream pollution legislation,—legislation that would enable the orderly solution of this problem as techniques were developed without disruption of employment or inordinate expense that must in a low profit industry, such as the paper and paperboard industry, ultimately be passed on to the consumer. By the same token, the industry was equally active in opposing what it considered to be obnoxious and unreasonable legislation that would have been impractical to carry out and enforce, and the enactment of which would have adversely affected the public welfare.

Action taken by officials of the National Conference on Weights and Measures held serious implications for the member mills of three Divisions of the parent association. The requirements of the resolution passed last June by the National Conference would have necessitated the marking of net weight on paper shipments of certain types and sale on this basis. The fact that this was contrary to the general industry practice established over many years, and the fact that considerable additional expense would be involved, was called to the attention of the committee handling this matter for the National Conference on Weights and Measures. Action has been postponed for the time being and submission of industry recommendations as to what practice would meet the requirements of the Conference has been requested. Such recommendations will, of necessity, be made. It is probable, out of these discussions, will grow a national pattern of net weight legislation which it is hoped will be within reason and not too burdensome to the industry. A net weight law was proposed in New Jersey which specifically mentioned certain grades of paper. Had this law been enacted it would have substantially changed the current practice in the sale of certain paper grades. Upon the request of the Association, a hearing was held in Trenton, New Jersey, at which selected industry representatives appeared and presented the case of the industry. The hearing was successful in securing the removal for the time being of all paper items, pending subsequent consideration.

Growing Pressure of Public Employment

A definite, national move is being initiated by certain organizations and individuals, which would in practice elimnate experience or merit rating systems in the States under State Unemployment Compensation Laws. Experience or merit rating systems were based upon the need for steady employment of labor and offered to industry a plan encouraging staple employment in individual companies. In opposition to this plan, strong pressure is being brought to substitute for continuous industrial employment, public employment during difficult times with a consequent increase in the public burden. The proposal to eliminate merit rating systems appears directly contrary to the American way of life as most of us know it, and as it has been soundly developed over the years. In opposing legislation that would do away with merit rating systems, the Association is working in close coordination with other agencies that appreciate the value of continuous industrial employment as contrasted to the semi-relief systems offered by public agencies.

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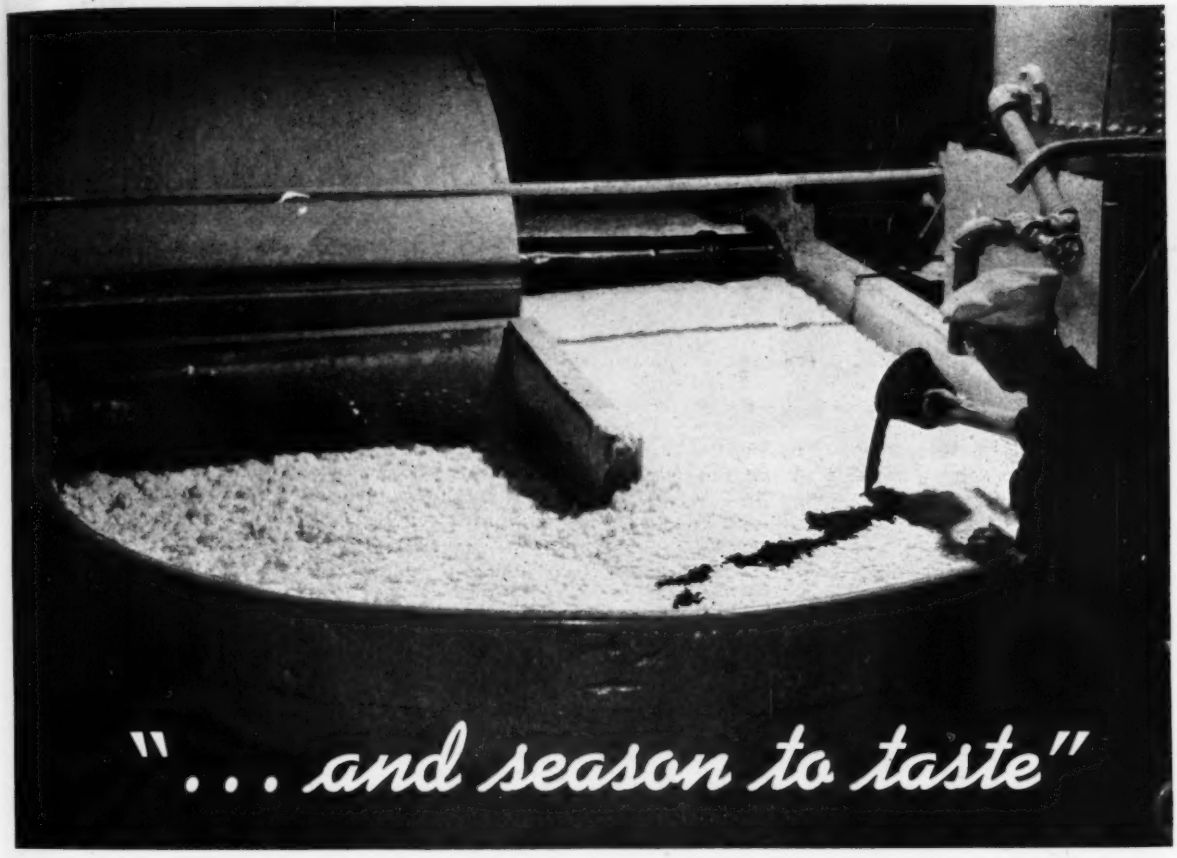
Warren Curtis, Vice Pres., 1889-91. F. C. Shattuck, Vice Pres., 1889-91. E. B. Denison, Vice Pres., 1890-91; 1899-1901. H. E. Mead, Vice Pres., 1890-02. B. D. Rising, Vice Pres., 1890-91; 1903-04. F. H. Parks, Vice Pres., 1891-92; 1900-01.



COOKBOOK METHODS actually did guide the beaterman not so many years ago. The kind of pulp he turned out depended on his experience and knowledge—and, sometimes, on how he felt that day.

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W. F. Whiting, Vice Pres., 1891-94; 1896-99. W. T. Barker, Vice Pres., 1894-96; Sec., 1890-94. A. W. Eaton, Vice Pres., 1894-96. J. N. Mohr, Vice Pres., 1896-99; 1906-07. A. G. Paine, Vice Pres., 1896-99; 1907-09. G. C. Sherman, Vice Pres., 1896-99; Sec.-Treas., 1894-96.

I would be seriously remiss if I did not mention the activities of the traffic committee of the American Paper and Pulp Association. The success of this committee in obtaining the simplification and clarification of the freight rate structure as it relates to groundwood, printing, writing papers, etc., has been a monumental contribution to the industry as a whole. This committee has labored long and arduously to accomplish this objective. The progress the committee has made, in cooperation with the railroads, to clarify the definitions for classification purposes, of paperboard items, represents a real achievement.

Proposed Freight Rate Structure Important

The proposal of the Interstate Commerce Commission to investigate the freight rate structure of the entire country east of the Rocky Mountains involves considerations that might, if improperly developed, affect the entire economics of the marketing of paper products in the United States. The Traffic Committee of the Association is carefully studying the issues involved. The industry was represented by a special subcommittee at a pre-hearing conference of the Interstate Commerce Commission, and through this subcommittee it subscribed to the position taken by nearly all large industrial shippers who were represented at the meeting. The important task of following closely the trend of these hearings and obtaining intelligent consideration of the paper industry's requirements, is of tremendous importance to the industry as a whole.

I have discussed some of the current activities of the association during the year 1940. Time does not permit any lengthy description of these activities or, in fact, a listing of all of them. However, I think they will give you some conception of the functions of the American Paper and Pulp Association as they relate to the welfare of the industry with respect to current problems that arise.

It is probably unnecessary for me to describe in detail the recurrent work of the association. During the past year major economic studies were compiled and given to the industry covering taxes, as related to the industry, economic trends and labor conditions within the industry, a study of the financial situation of various paper company operations, and numerous other analyses. The current work being accomplished by means of industry contributions made through the budget of the American Paper and Pulp Association and under the guidance of its Technical Committee, working directly with the Institute of Paper Chemistry, involve instrumentation research and biological control studies, as well as the work of classification and definitions. I believe these activities have been, in the opinion of the Executive Committee, fully justified and of importance in promoting the general well being of industry progress along technical lines.

Activities of Parent and Divisional Associations

Mr. Riegel has issued a report covering the activities of the Association during the calendar year 1940. I am sure that a review of this report will indicate to you clearly the distinction between the work of the Divisional Associations supporting the American Paper and Pulp Association and that of the parent association itself. Since the parent association deals exclusively with over-all industry problems, or problems involving more than one of its Divisional Associations, it must of necessity have less personal relationship with individual company problems. However, it seems perfectly clear that individual company

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S. P. Train M. M. Armstrong W. M. Crane G. W. Hammond Frank Squier Elisha Morgan

S. P. Train, Vice Pres., 1897-99. M. M. Armstrong, Vice Pres., 1899-1901. W. M. Crane, Vice Pres., 1899-1900. G. W. Hammond, Vice Pres., 1899-1901. Frank Squier, Vice Pres., 1899-1901. Elisha Morgan, Vice Pres., 1900-01.

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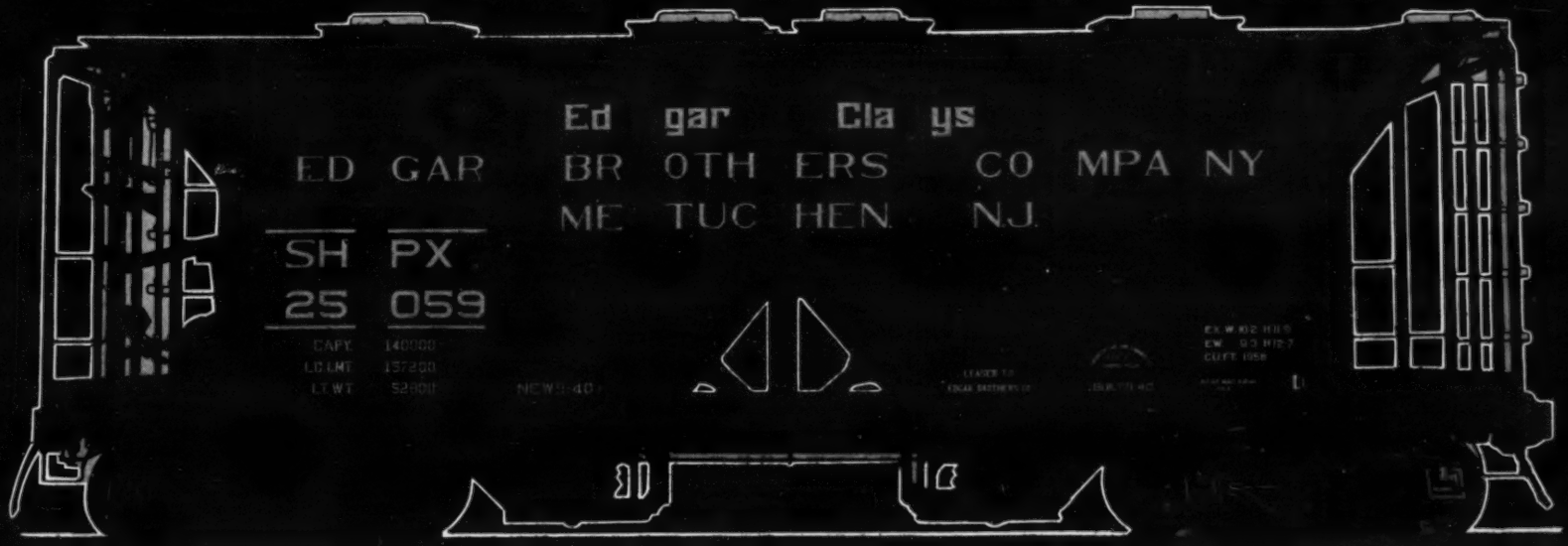

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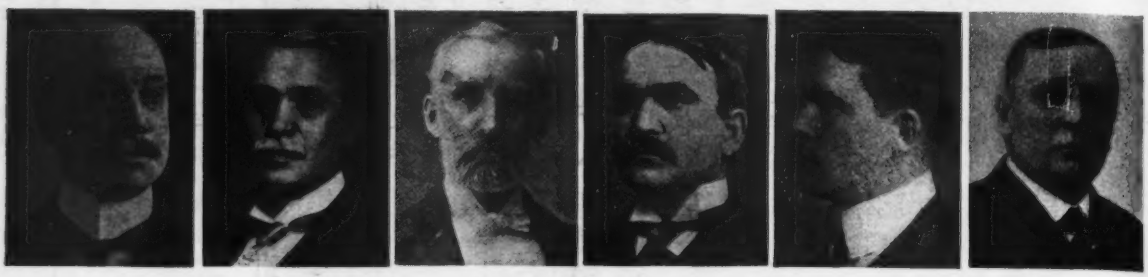

J. B. Forsyth J. G. Luke C. S. Merrill C. W. Rantoul J. S. Riegel G. E. Bardeen

J. B. Forsythe, Vice Pres., 1901-03. J. G. Luke, Vice Pres., 1901-03. C. S. Merrill, Vice Pres., 1901-03. C. W. Rantoul, Vice Pres., 1901-03; Sec.-Treas., 1899-1901. J. S. Riegel, Vice Pres., 1901-03. G. E. Bardeen, Vice Pres., 1903-05.

knowledge of industry trends is increasingly important. The over-all industry statistics compiled by the American Paper and Pulp Association are devoted specifically to the purpose of promoting such knowledge. The increasing impact of policies and legislation of the National Government upon the industry is known to every thinking executive in the industry. As a business proposition, it seems most economical and effective to meet these national problems through the central organization equipped to handle them, rather than through individual efforts of the 14 Divisional Associations that support the American Paper and Pulp Association. In my opinion every company executive in a position to make such determination should consider whether it is good business to pass the burden of meeting these over-all industry problems to companies recognizing their responsibility. It would appear to be a serious error to deprive company management of the knowledge of industrial trends in the paper industry that can be obtained through a review of current information issued by the association. Certainly, no one can question the necessity of such information and of industry action on specific problems affecting the industry.

In conclusion may I say that it is my hope that the American Paper and Pulp Association may serve as a focal point for consideration on the part of the industry of its inevitable post-war problems. It seems to me that industry intelligence and industry consciousness will be particularly vital when these problems arise. Certainly they deserve consideration as rapidly as conditions indicate what the probabilities are. It appears vitally necessary that the industry develop a plan or plans to meet changed conditions and that it take an active part in obtaining understanding on the part of Congress of the needs of the situation.

Address of George H. Mead

The following address was delivered by George H. Mead, president of the Mead Corporation:

It has long seemed to me that the assistance rendered to management of all units by a well-run and properly governed association was so obvious as to require little comment.

All one needs to do is look over the history of business since the beginning of the present century, and note the success that has come to such industries as have operated with well-directed associations, and the failure that has attended those in which associations have failed to function, or have been misguided.

Certainly the developments for the past ten years should have eliminated any doubt in the minds of disbelievers, and while there will probably always be some "Isolationists," it is my humble judgment that they will be much harder to find in a rather short time. Not, perhaps, that they will "choose" to change their minds, but will be forced to do so by circumstances over which they have no control.

Presents a Difficult Problem

It would be interesting to know how much serious thought has been given by the members of this association to a possible situation the country would be in if the European war should end tomorrow. This presents a difficult problem, and every month the world conflict continues multiples the difficulties. Can a loosely organized democracy maintain a position of any importance in a world of totalitarian competition?

There is not much consolation in a review of the

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J. S. Barnes Frederick Bertuch J. R. Carter Frank Grubb J. A. Roberts W. O. Ball

J. S. Barnes, Vice Pres., 1903-05; Sec.-Treas., 1901-03. Frederick Bertuch, Vice Pres., 1903-05. J. R. Carter, Vice Pres., 1903-05. Frank Grubb, Vice Pres., 1903-05. J. A. Roberts, Vice Pres., 1903-05. W. O. Ball, Vice Pres., 1904-06.

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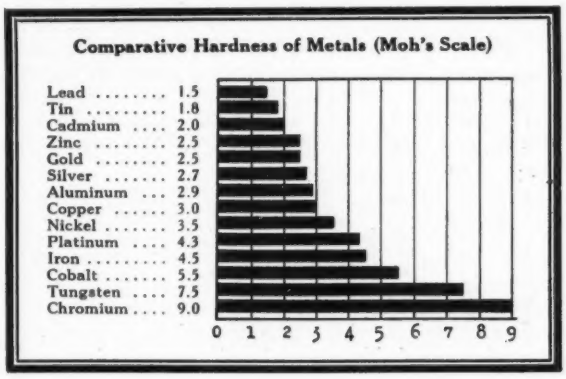

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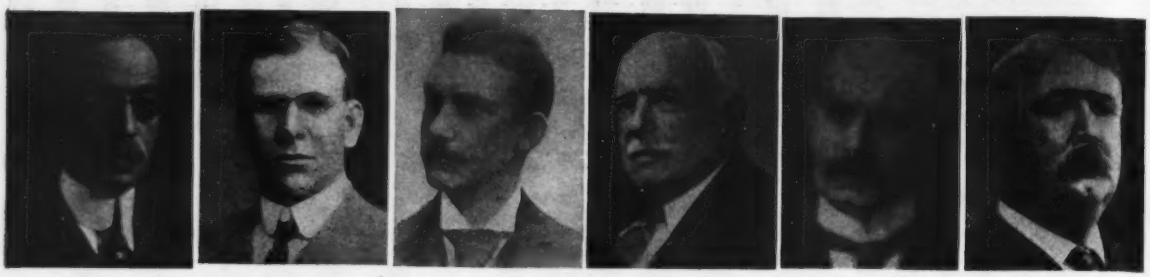

G. T. Keyes | R. B. McEwan | Charles McKernon | C. F. Smith | A. H. Ivins | E. C. Robertson

G. T. Keyes, Vice Pres., 1905-06. R. B. McEwan, Vice Pres., 1905-06. Charles McKernon, Vice Pres., 1905-06. C. F. Smith, Vice Pres., 1905-06. A. H. Ivins, Vice Pres., 1906-08. E. C. Robertson, Vice Pres., 1906-09.

unemployment situation of the United States during the decade just closed and the many other resultant problems of the depression of the early thirties which have not been reasonably well cleared up by us,—and the word US is used advisedly. We individually and collectively have a grave obligation that we must first vision, and then try to gradually discharge.

The pulp and paper industry is perhaps still more individual than most of the major industries. Many of its companies have ownership management. It is composed of a great number of smaller units with comparatively few consolidations of plants with great numbers of stockholders. It is therefore particularly well constituted to supply a group of men who can render real service not only to itself but to the country.

A substantial part of its output is sold to publishers for the purpose of disseminating knowledge and news to the public, and in furthering intellectual development. Other large tonnages go to the food and allied industries that are necessary to the maintenance of life itself. While it may be idealistic to talk of the influence the use of our products might have on our attitude toward things social and economic, it is nevertheless true that in the production and character of our goods we play a vital part in development of this country.

Should Show Reasonable Foresight

It is surprising with what complacency the present situation is viewed by so many people. After observing the neglect of England and France, as well as of ourselves to prepare, not only for national defense, but also a mental and moral resistence to evils of worldwide revolution, the United States should now begin to show some reasonable amount of foresight.

It has recently been said by one of our distinguished columnists that we will have to choose between a "democratic socialism or a military capitalism." Undoubtedly we will pass through the military capitalism before reaching the democratic socialism which is the more desirable of the two. The degree of socialism of a continuing democracy, and the strength of its existence, still depends upon the leadership given it, and since America has been essentially an industrial nation, leadership should properly come from that group or segment of society,—meaning you men in this room and others like you.

As some of you know, it has been my privilege to spend considerable time during the past eight years in Washington, and when the opportunity of having a "ring-side" seat without actually participating in the "battle royal" itself, was offered, it was accepted in the hope that such experience would make possible an analysis of the workings of democratic government from an industrial standpoint, and develop some definite conclusions as to how a period of business life similar to the past decade might be avoided in the future.

I am somewhat embarrassed to admit my stupidity to my associates here, and particularly to competitors, but in the first six years I got nowhere. It required a second world war to begin to clarify my mental processes, but I now feel more hope than before that a solution can be found for our own country, and that with it we may prove of some value to the rest of mankind.

The question is, whether or not a democracy can organize itself morally, physically and spiritually to a sufficient degree, and I believe it can.

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E. P. Lindsay, Vice Pres., 1907-09. G. M. McKee, Vice Pres., 1907-09. C. H. Remington, Vice Pres., 1907-09. H. M. Burnett, Vice Pres., 1908-09. H. L. Paddock, Vice Pres., 1908-09. G. F. Steele, Vice Pres., 1909-13.

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C. I. McNair, Vice Pres., 1913-14; Sec.-Treas., 1910-12. L. M. Alexander, Vice Pres., 1917-19. A. H. Nevius, Vice Pres., 1919-21. A. L. Pratt, Vice Pres., 1921-23. W. D. Randall, Vice Pres., 1923-24. F. Pagenstecher, Vice Pres., 1927-30.

Great Industrial Organization

We have progressed from a nation of "rugged individualists" to one of great industrial organization, with people more dependent upon one another in every phase of daily life than ever before. We must now organize the nation as we have the units of production, and if this makes social democracy we must learn to like it.

But why not like it, and do it, and make the country a greater and more personal democracy. We have in Sweden a living example of the first experiment along such a political road, and so far they have preserved a rather enviable position in war-torn Europe. Of course, some of their developments might not "suit our book," and we can profit by mistakes that have been made. Some say,—But Sweden is a small country and a homogenous race. Are the steel producers of the United States because they are many times larger than the Swedish producers any less well organized in their companies?

Must we admit that the great people we have developed from pioneers of all nations in the world cannot now solve their own problems of self-government? A few years ago a law was placed on the statute books of this country called the N. R. A., which was later declared unconstitutional by the Supreme Court. During many months of that movement I sat in Washington and watched the business men of America—financial, industrial and commercial—try conscientiously to "make the damn thing work." Some disbelieved from the start, but a great majority found much of it to their liking and of real value. I do not believe this was only a passing experiment. The word Socialistic was seldom applied to it even by its critics and the people generally felt that it could be carried on without destruction of democracy.

Recent rulings and decisions of the Supreme Court indicate that with some minor changes a new law similar to the National Recovery Act would undoubtedly receive approval as to its constitutionality, and with certain alterations it might be to the best interests of the country, and to industry itself, to have such legislation.

Decision in labor problems were settled in a better manner around the N. R. A. table than by the Labor Board that followed.

The setting aside of the N. R. A. was considered by many persons as a starting point of the business improvement of that particular time, but later judgment was very doubtful on this point. The two labor laws that followed the extinguishment of the N. R. A., namely, the Wagner Act and the Wage and Hour Bill, while not objectionable to industry in principle, have not been satisfactory in all respects in administration, and have not permitted, in my opinion, as satisfactory a labor situation as existed during the N. R. A.

There is a very large building in Washington filled with people working on problems of business and industry called the Department of Commerce. Its operation is paid for by you as tax payers, and it was established as the department of government responsible for the welfare of commerce and industry and to promote their interests and development. Of how much use has it been to you and your companies? Not very much; and I think it is your fault. It should be of greatest assistance and value, and it must be, if the organization of this country to which I have referred is to be accomplished.

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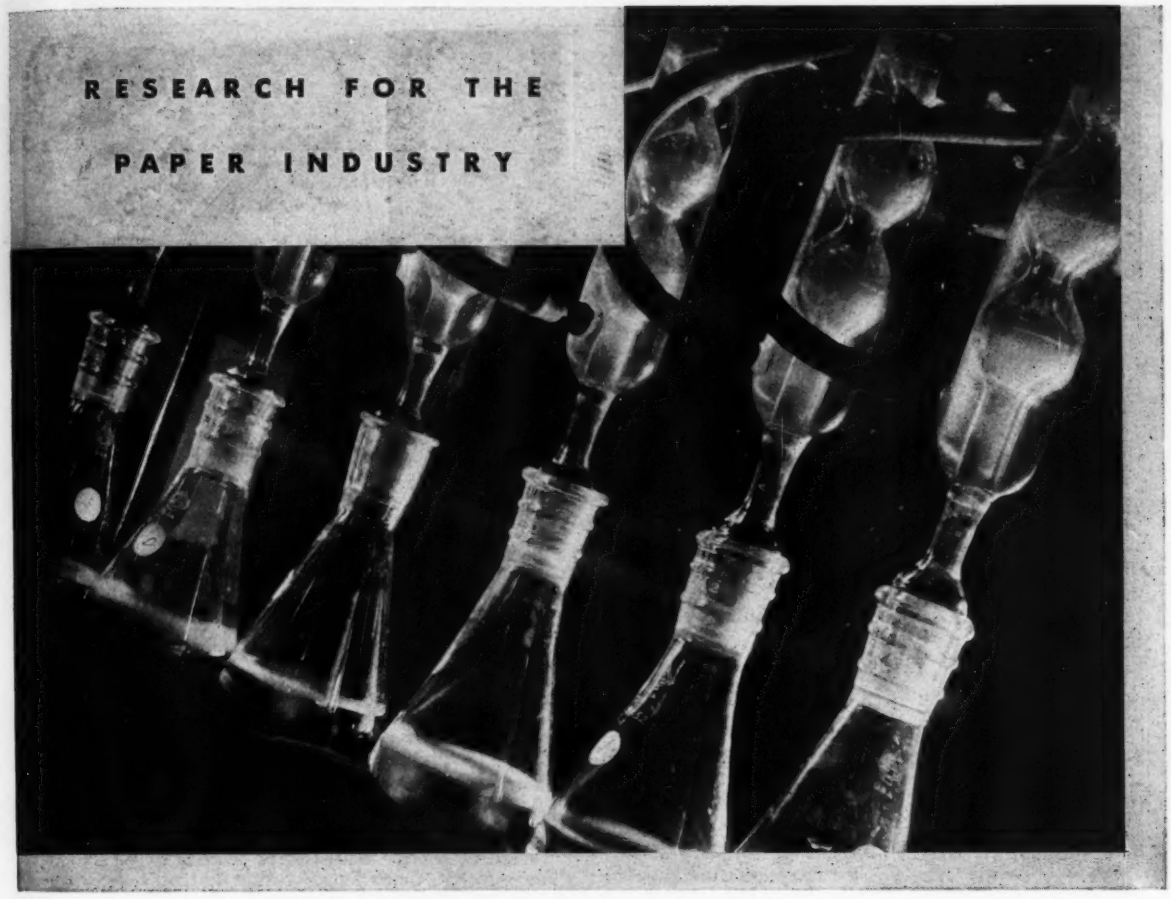
M. E. Marcuse | W. M. Crane, Jr. | W. L. Carter | G. H. Mead | H. W. Ellerson | A. R. Graustein

M. E. Marcuse, Vice Pres., 1929-31. W. M. Crane, Jr., (Photo by Bachrach) Vice Pres., 1930-31. W. L. Carter, Vice Pres., 1931-33. G. H. Mead, Vice Pres., 1931-32; 1933-35. H. W. Ellerson, Vice Pres., 1933-36. A. R. Graustein, Vice Pres., 1933-36.

RESEARCH FOR THE PAPER INDUSTRY



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PM-76

OFFICERS, PAST AND PRESENT, OF THE AMERICAN PAPER AND PULP ASSOCIATION

J. D. Zellerbach H. J. Chisholm S. B. Copeland J. R. Miller R. J. Cullen Z. W. Ranck

J. D. Zellerbach, Vice Pres., 1933-41. H. J. Chisholm, Vice Pres., 1934-41. S. B. Copeland, Vice Pres., 1934-40. J. R. Miller, Vice Pres., 1935-41. R. J. Cullen, Vice Pres., 1936-41. Z. W. Ranck, Vice Pres., 1936-38.

Duty and Opportunity of Business

One of our contemporary historians for whom I have high regard, James Truslow Adams, in writing upon the subject of duty and opportunity of business, has said—"There is no use in having a sound tooth in a dead body." No words could better describe the futility of individual plant operation in a sick industry and disorganized America. Of what use is the finest and best managed paper mill in the United States if the country becomes prostrated by revolutionary upheaval or financial disaster. The eyes of the world are upon us, and the hopes of all people who love liberty and worship God await our decision as to if and how democracy shall survive. Each of us can do something to help individually in the present emergency by giving moral as well as financial support to our government; we must have a united nation. There is a powerful statement in the saying, "How infinitesmal is that which I can do, but how infinitely important that I should do it."

We can do more as employers of men and distributors of goods by using tolerance and moderation in all activities. We can do most, however, as individuals collectively by cooperation with government, not only assisting in, but helping to direct the organization of all business; by developing a new understanding of the functions of government, and working with it through the channels that have been provided for just such purpose.

This is the great function of an association, and its importance cannot possibly yet be estimated. The money and time spent by you gentlemen at this critical hour in the building of a fine well-organized and directed Association is the best investment you can make for your stockholders, and yourselves as managers of important properties. If you fail to do so now the government will, in my humble judgment, demand it of you, or in a little while do it for you.

Cooperation Needed

We continually insist that in a democracy the people rule, and the government exists for the purpose of maintaining that law and order necessary to the proper discipline and direction of the nation,—but the government, being responsible to the people, must also have their cooperation, and the nation must be organized to function. Accordingly in today's world crisis it must also be organized to protect itself from destruction. The doing of this job must now be considered by the leaders of industry and commerce above all else.

We are living in an already new world, and it is changing further with every hour that passes. Never have we been more dependent upon one another, nor needed greater unity in all things. Through personal knowledge I can assure you of the desire of those entrusted with government to have your help. It is my sincere hope that this important industry, to which I have given a modest life-time of effort, and for which I hold great affection, will, through the American Paper and Pulp Association, put forth every possible effort toward the real organization and maintenance of a lasting Democracy.

A. P. and P. A. Elect Officers

At a meeting of the Board of Governors of the American Paper and Pulp Association, the following officers were elected:

President, J. L. Riegel, Riegel Paper Corporation, New York.

Vice-Presidents: D. K. Brown, Neenah Paper Company, Neenah, Wis.; Hugh J. Chisholm, Oxford Paper Company, New York; R. J. Cullen, Interna-

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R. A. Hayward W. H. Anders D. K. Brown R. K. Ferguson W. B. Merlin W. I. Osborne, Jr.

R. A. Hayward, Vice Pres., 1937-41. W. H. Anders, (Photo by Blank & Stoller) Vice Pres., 1938-40. D. K. Brown, Vice Pres., 1939-41. R. K. Ferguson, (Photo by Jenkins & Guillo, Inc.) Vice Pres., 1939-41. W. B. Merlin, Vice Pres., 1940-41. W. I. Osborne, Jr., Vice Pres., 1940-41.

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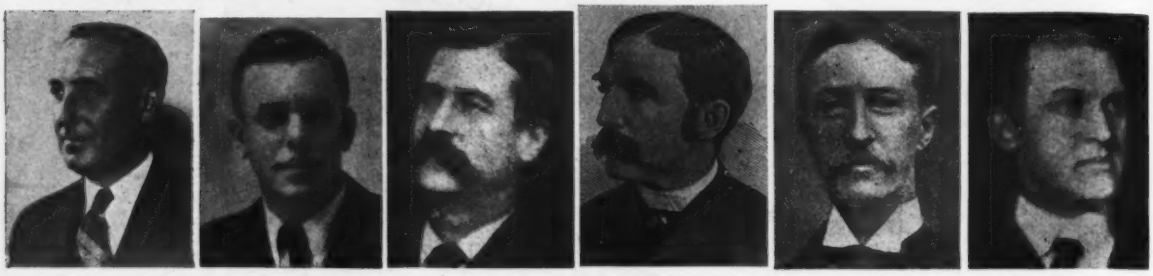

C. G. Parker | Vertrees Young | G. W. Wheelwright | D. P. Crocker | W. H. Parsons, Jr. | C. W. Lyman

C. G. Parker, Vice Pres., 1940-41. Vertrees Young, Vice Pres., 1940-41. G. W. Wheelwright, Treas., 1880-83. D. P. Crocker, Sec.-Treas., 1883-86. W. H. Parsons, Jr., Sec.-Treas., 1896-97. C. W. Lyman, Sec.-Treas., 1897-99.

tional Paper Company, New York; D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.; P. H. Glatfelter, P. H. Glatfelter Company, Spring Grove, Pa.; Ralph A. Hayward, Kalamazoo Vegetable Parchment Company, Parchment, Mich.; W. B. Merlin, Hollingsworth & Whitney Company, New York; John R. Miller, West Virginia Pulp and Paper Company, New York; W. I. Osborne, Jr., Cornell Wood Products Company, Chicago, Ill.; Cola G. Parker, Kimberly-Clark Corporation, Neenah, Wis.; Norman W. Wilson, Hammermill Paper Company, Erie, Pa.; D. L. Stocker, Michigan Paper Company, Plainwell, Mich.; J. D. Zellerbach, Crown Zellerbach Corporation, San Francisco, Calif.

Executive Secretary, E. W. Tinker, 122 East 42nd street, New York.

Open Forum Meeting

An open forum meeting was held on Wednesday, February 19, at which D. C. Everest, of the Advisory Committee to the Council of National Defense, and President of the Marathon Paper Mills discussed "The National Defense Program and Its Possible Effects on the Industrial Labor Forces," and R. H. Hayward, president and general manager of the Kalamazoo Vegetable Parchment Company, discussed in considerable detail company-employee relations and described the policy which his organization has adopted to promote a better understanding among its employees.

Address by D. C. Everest

Information bearing upon the subject of "The National Defense Program and Its Possible Effects on the Industry's Labor Forces" is presented below in rough outline form:

I. Magnitude of the National Defense Program

National defense contracts awarded by the Army and Navy during the period June 13th to December 31st, 1940, are as follows:

	(000 omitted)	
Construction*	$1,376,000	12.5%
Ships	4,931,000	44.8%
Airplanes and Parts	2,187,000	19.9%
Supplies and Ordnance	2,505,000	22.8%
	$10,999,000	100.0%

* Largely military training camps and facilities.

The above figures portray *just the beginning* of our National Defense Program. It might be pointed out that:

1. The President has asked Congress to appropriate 28.5 billion dollars for national defense for the period June 1940 through June 1942—the above 10.9 billion dollars being a part of this program.

$17.1 billion has already been approved by Congress—leaving $11.1 billion still to be o.k'd.

2. Notwithstanding these staggering amounts, the President pointed out in his recent budget message to Congress that: "No one can predict the ultimate cost of a program that is still in development, for no one can define the future. When we recall the staggering changes in the world situation in the last six months, we realize how tentative all present estimates must be."

3. Moreover, the above figures do not include any provisions for "aid to Britain." We will not definitely know the form and amount of such aid until the "Lease-Lend Bill" is passed, but there is little doubt that such aid will be substantial.

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A. E. Wright, Sec.-Treas., 1903-05. A. K. Luke, Sec.-Treas., 1905-07. Louis Chable, Sec.-Treas., 1907-10. A. G. Maury, Asst. Sec.-Treas., 1911-14; Treas., 1914-15. C. F. Moore, Sec., 1913-14. A. D. Naylor, Sec.-Treas., 1915-18.

519 Teeth

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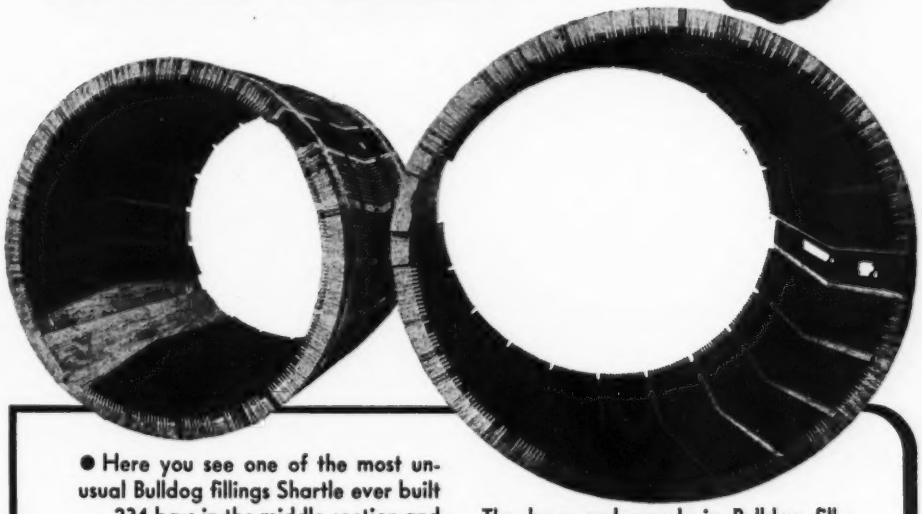

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The bars and woods in Bulldog fillings are anchored for keeps . . . simply can't come apart. And each section is amazingly easy to install . . . just ram home one wedge and the job is done. Furthermore, you can chip the woods evenly and quickly as the bars wear down.

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II. Labor and the National Defense Program

A. *The Labor Reservoir Available*

Unemployment in the Unitied States (based on National Industrial Conference Board figures) during December 1940 was 7,000,000[1]. This is in excess of the low point of unemployment (5,000,000) for the decade of the thirties, reached in September 1937, *but it is the lowest for any December since 1930.*

Moreover, the December 1940 figure includes 2,500,000 persons on emergency relief projects (W.P.A, C.C.C., and out-of-school N.Y.A. work). If these are deducted there remains a total of about 4,500,000 job seekers without any work.

About a million of these should be absorbed by agriculture in the next few months, leaving about 3.5 million available for the expansion of defense industries.

B. *Possible Effects of the Defense Program on this Reservoir*

The Conference Board estimates that by this summer 1,800,000 more persons will be employed as a direct result of the National Defense Program. This, as the Conference Board points out, "makes no allowance for the natural impetus that will be given to civil production because of increased income available for consumption by workers who would be unemployed if it were not for the defense program. Nor does it take into account the expansion of industry, both for defense purposes and for civil output, that will necessarily result from anticipation of new defense contracts and of increased general consumption."

In connection with the above statement, Mr. William Conover of the National Defense Advisory Commission forecast that there might be two to three million new workers needed in consumer industries as a result of the money placed in circulation by expanding industrial payrolls. (New York Times, Nov. 17, 1940)

Secretary Perkins is considerably more optimistic, estimating in her last annual report (released January 4, 1941) "that 5,000,000 to 6,000,000 jobs would be available in the next eighteen months for those now idle.

Also to be considered is the fact that approximately half a million men are to be inducted into the Army by July 1, 1941.

[1] Although this is one of the lowest estimates of unemployment, it may be 1,500,000 persons too high according to a sample check just made of 1940 Census figures.

C. *Available Labor Supply is of Relatively Poor Quality*

The United States Employment Service reports that of the 4.5 million persons actively seeking work today less than 2 million are qualified for either semi-skilled or skilled occupations. More important is the fact that only 185,000 of these are registered in occupations essential to the defense industries. Furthermore, most of these persons are fairly "rusty" at their particular skills because of long periods of unemployment.

Because of this exceedingly small reserve supply, shortages are already appearing in certain occupations —especially in the skilled trades. Industries already affected are the machine tool, automotive, electrical equipment, foundries, hardware and plumbing, heavy machinery, nonferrous metals, railroad equipment, steel, and wire and cable.

In today's industrial economy we need a greater proportion of skilled and semi-skilled men. In this connection, the recently released annual report of the Secretary of Labor points out that the defense program, as now set up, will require approximately 35 per cent skilled labor, 40 per cent semi-skilled, and only 25 per cent unskilled.

To Summarize: The labor picture so far as *quantity* is concerned is by no means clear although there is probably sufficient man-power available for the next six to nine months of national defense effort. In this connection, Professor L. J. Reynolds of Johns-Hopkins University estimates that at the peak of defense production there will probably be two million unemployed because they will not be in the right *localities* or because they will have been trained in the wrong *occupations.* The labor problem is, therefore, one primarily of *quality.*

Thus we face the paradoxical situation of both unemployment and labor shortages. As Professor Leo Wolman of Columbia University has recently pointed out: "The fact that serious labor shortages and surpluses of unemployed can co-exist within the confines of a country does not lessen the gravity of the problem of labor shortage but only points to the existence of conditions in the labor market peculiar to these times."

D. *Remedial Measures*

1. Employee Training for the Defense Industries

Both the Army and Navy are now training men for work in Government arsenals, ship building yards, munitions plants, etc.

Moreover, the United States Office of Education is cooperating with State Vocational Boards in a broad training program. As a consequence, over one thou-

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H. P. Baker, Sec.-Treas., 1920-28. O. M. Porter, Sec.-Treas., 1928-29; Asst. Sec., 1934-35. J. H. Neal, Gen. Mgr.-Treas., 1930-32. C. W. Boyce, Sec., 1930-40; Asst. Sec.-Treas., 1929-30. E. W. Tinker, Sec., 1940-41.

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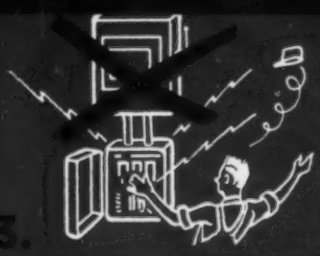

3.

DANGER FROM "HOT" PARTS

You can't touch live parts on the combination starter. The switch must be OFF before the cover can be opened.

3 THINGS YOU'LL AVOID

...MEMBER when individual motor drives first ...re used in paper mills? Often installed with ...parate protective covers and open reduction ...ars, these early drives frequently were cumber...me to set up, bothersome to inspect, and took ...s a lot of space.

...day individual motor drives are more compact ...d provide extra protection. Correspondingly, ...e combination motor starter provides modern ...uit protection and a magnetic starter in one ...mpact unit. This control does the work that ...merly required two or more separate devices. ...e buy it as a unit, install it as a unit, and ...enefit from a lot of other important advantages.

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CIRCUIT SWITCH PLUS SHORT-CIRCUIT PROTECTION

MAGNETIC STARTER

with G-E COMBINATION STARTERS

GENERAL ELECTRIC

sand public vocational and trade schools are now giving pre-employment and supplementary training courses for workers needed in the National Defense Program. Over 100 thousand were enrolled in these courses during the first two months of their operation. It is planned to extend these training facilities to an additional 600 thousand workers in skills of special value to the National Defense Program. This work is to be supplemented by the training of an additional 400 thousand boys enrolled in C.C.C. camps and the N.Y.A.

2. Longer Hours of Work?

The International Unions will make every effort to maintain the standard work week at forty hours with time and a half pay for overtime.

According to two recognized authorities on labor (Wolman of Columbia and Slichter of Harvard) this is the crux of the entire problem. Wolman has pointed out that until a sufficient number of workers are trained, "in order to achieve the defense production we want, we shall be forced to increase prevailing hours of work."

Slichter has a more dramatic stating in the July issue of the Atlantic Monthly: "At a time when more production is needed in a hurry, why should the Fair Labor Standards Act be permitted to create a privileged class that jeopardizes the security of its own members and of every one else? Either the security of the country is threatened or it is not. If it is not, then our immense expenditures on armaments are an inexcusable waste. If it is, then the maintenance of a forty hour work week is a criminal betrayal of the safety of the country."

3. Multiple-Shift Operations

This is being tried in a number of industries. But in other industries sufficient numbers of skilled and semi-skilled men are not available to man additional crews.

4. Labor Raids on the Non-Defense Industries

Because of the above factors, the transfer of men from the non-defense to the defense industries has become inevitable. As the Conference Board reported on January 16, 1941: "Where shortages exist or are in prospect in highly trained employees, it will be necessary to procure considerable numbers of such men for expanding defense industries from non-expanding industries. It is not desirable to seriously handicap any employer and care should be taken not to procure too many men from the same source. Non-expanding industries, however, must train replacements in trades where shortages are in prospect as their share in the defense effort."

Such developments are already evidence in the paper and pulp industry.

III. Effects on the Paper and Pulp Industry

The industry has already lost a number of skilled maintenance men, such as machinists and electricians, to the defense industries.

This movement has been more pronounced in and around shipbuilding centers such as Bath, Maine, and Newport News, Virginia, and large eastern industrial areas, than in more remote localities.

Another interesting development is that in this industry *the skilled workers do not seem to be the ones attracted by the defense jobs.* Most of the industry's skilled men have been with their companies for many years, are already working at high wages, and have considerable stakes in their seniority rights. Furthermore, many of such workers have bought homes and are well settled in their respective communities. The defense jobs, therefore, appear more attractive to the younger men working at semi-skilled occupations, or as apprentices or helpers on skilled operations. This is the group of workers with which the industry should be primarily concerned.

How Can This Industry Best Protect Itself From These Developments?

1. Higher Wages?

Much union pressure is being or will be exerted for higher wages—especially in the maintenance occupations. However, with many companies already paying between 85 cents and $1.00 per hour for these occupations, with paper prices at current levels, and with costs steadily advancing—further wage increases are strictly limited.

2. Improve Employer-Employee Relations

"Along the lines Ralph Hayward has pointed out this afternoon"—He will present a thirty to forty minute talk on this problem.

Companies should point out to workers the instability of employment in the defense industries. Moreover, the costs of living tend to be high in defense industry centers, and hours of work are relatively long.

3. "Upgrading" of Employees

This procedure in its simplest form provides that skilled workers perform only skilled operations leaving the remaining operations to men of lesser skills. In the paper and pulp industry this applies principally to electricians, machinists, millwrights, and pipefitters, all of whom are engaged in maintenance operations. If successfully carried out such a policy should allow a company to operate with fewer skilled workers, and at the same time afford training in the partially skilled operations to a greater number of men.

4. The "Step-Up Shift Plan"

This procedure provides for a rotation of shift and tour workers at different jobs while regular job holders are off duty. In the paper machine room, for instance, on the day that the machine tender of a certain shift is off duty the backtender of that shift steps into his job; the third hand performs the backtender's operations, etc. This procedure is altered as other members of the shift are absent. Although some sacrifices of operating efficiency may result, this technique obviously goes a long way in providing a company with trained reserves for at least some of the more important production jobs.

5. Apprenticeship Training

Such training is particularly adaptable to maintenance operations although it is a rather long-time proposition. However, a number of companies are intensifying and thus shortening the training period.

Companies can obtain valuable assistance in apprentice training procedures from the Federal Committee on Apprenticeship, Washington, D. C. Many companies have refrained from starting apprenticeship programs because of the minimum wage problems involved. However, present regulations under the Wage and Hour Act make it possible to pay a wage less than the minimum wage rates, provided apprentices are registered with the State Apprenticeship Council or the Federal Committee on Apprenticeship, and provided an official apprentice certificate is secured from the Wage and Hour Administrator.

6. In-Service Training

This can be carried out with companies' own in-

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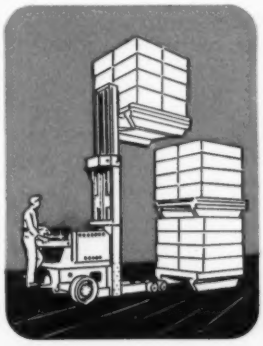

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structors, with the assistance of vocational education authorities, or with correspondence schools which offer courses in pulp and paper making and in the various mechanics' trades.

7. Intensified Supervisory or Foreman Training

A number of companies are teaching foremen how to train men in their departments for the more highly skilled jobs. This procedure calls for a rather high type of foreman.

8. The Government's "Training Within Industry" Program

This program is a part of the National Defense Advisory Commission's work, and is purely an advisory service for industry. It is under the personal supervision of C. R. Dooley of the Socony-Vacuum Company, assisted by Walter Dietz of Western Electric, both recognized experts in the field of personnel relations.

Although the program was primarily established to assist defense industries with their training problems, this service is available upon request for *all industry*. Interested paper and pulp companies should contact "Training Within Industry," Washington, D. C. If present plans materialize, forces of men temporarily on leave from industry will soon be in the field to assist manufacturing companies with their training problems.

At All Odds

Each company should analyze its own situation. It should know:

1. What its "key" jobs are, and
2. What kind of men are required to fill those jobs

Many companies have:

1. Made an inventory of the skills and experience of each worker, and thus know which employees are ready for promotion should vacancies occur.
2. Determined which men they will probably lose through induction into military service.
3. Made or obtained through the United States Employment Service a survey of the skilled and semi-skilled labor in their localities which can be employed should vacancies appear.

Address of R. A. Hayward

Mr. Hayward spoke as follows:

Industrial understanding is the foundation of sound and permanent industrial relationships. It is even more than this—it is the line of defense against the forces which are trying to attack and destroy our system of free enterprise and democracy.

For many years all of the industralized nations of the world have been passing through a social evolution and an industrial revolution.

This industrial revolution has been directed against the theoretical concept of capitalism and free enterprise. Many countries have passed over to state capitalism under various names such as communism, nazism, fascism, etc. It is even possible to adopt these philosophies under the name of democracy.

Along with this has been a struggle by the various countries to control the resources, production facilities, and trade.

Back of all this turmoil is an effort by various nationalities to provide security for their people at the expense of the other peoples of the world.

The net result of this struggle to date has been the practical destruction of all security for all people, and a lower standard of living than they should enjoy.

The last world war and the present one are both outbreaks in this struggle. When the war ends, there is still no assurance that this basic conflict will not continue.

Policy of Country Confused

This country offers a good example of this paradox. We are spending billions of dollars and training millions of men for the defense of freedom and democracy. At the same time we are moving directly toward complete regimentation of industry and a nationally planned economy.

It is not commonly understood that free enterprise, operating under reasonable regulation, is democracy. When you completely regiment industry, you destroy democracy.

We are buying a one-way ticket, station by station, on a road leading to an unknown destination. The scenery along the way is beautiful and each station is fascinating.

What the ultimate destination will be, no one knows; but it may not be entirely to our liking. You can be pretty sure that it will resemble the conditions that are found in some of the foreign countries, where they have already completed the journey.

The control of industry can only be administered finally by control of the press and control of all means of spreading education and propaganda. This leads to restrictions on freedom of assembly, freedom of worship, freedom of the courts, and all other freedoms as we now know them.

The experience of every country that has passed through this change shows that it is necessary for the government to remove these freedoms in order to plan, control, and operate industry.

Nazism and Fascism are only the practical, realistic operation of a politically controlled economy where industry is privately owned but completely regimented.

In the last analysis the working people suffer most from such a program of regimentation. They not only lose their freedom and security, but also the opportunity of improving their position. The inefficiency that develops results in a lower standard of living for all people.

In every country, there is a universal concept of capitalism and free enterprise, which is repugnant to a large majority of the people. This you would expect because it has been the basis of our economic teachings and the foundation of most of our political speeches.

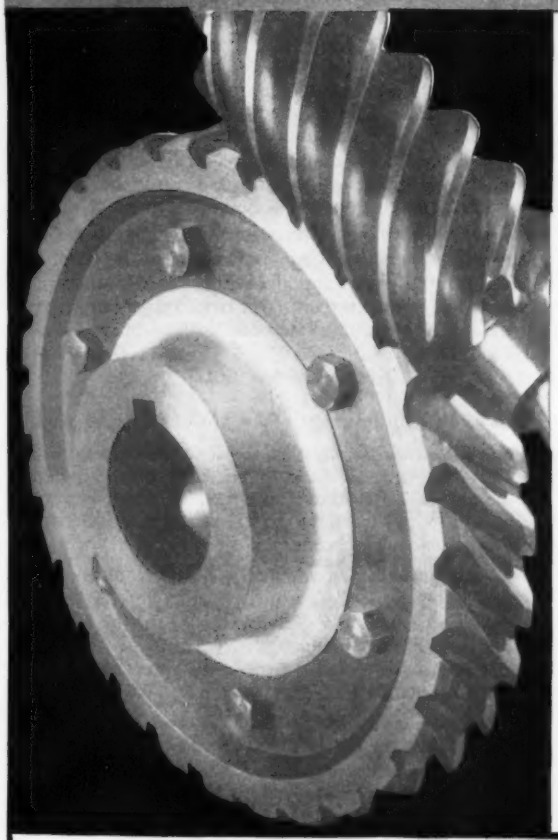
Inasmuch as this revolt is against what people think of capitalism, should we not examine this concept and see if it represents conditions as they exist today?

Popular Concept of Capitalism

What do people think about the capitalistic system and the operation of free enterprise?

1. That capital is an intangible, impersonal, selfish entity that seems to be associated occasionally with a few people controlling unlimited volume of wealth.
2. That capital controls the raw materials and the equipment for carrying on the production processes.
3. That industry is operated solely for the selfish interests of capital without regard to any social responsibility that it may have.
4. That there is a perpetual struggle between capital and labor and between capital and the public interests.

CLEVELANDS THIS WAY throughout the Pulp and Paper Industries



One of the oldest industries in the United States, the production of Pulp and Paper has in the past quarter-century grown to be one of the largest.

Volume production began to get under way about the time Cleveland brought out standardized lines of Worm Gear Speed Reducers. Throughout the years since then, Clevelands have continually been applied to heavy-duty equipment —in many cases operating 24 hours daily.

Today, thousands of Cleveland Units are serving more than 125 separate applications in Pulp and Paper Mills and their rugged capacity to take heavy shock loads for long hours of operation without let-up is proverbial.

Bring "Clevelands *your* way" now, by requesting the revised, comprehensive Cleveland Catalog, or asking us to send a District Representative. The Cleveland Worm & Gear Company, 3291 East 80th Street, Cleveland, Ohio.

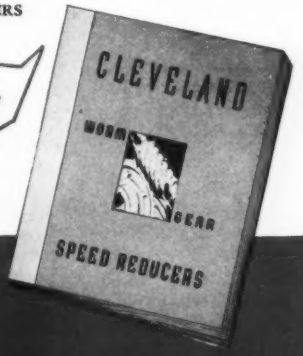
Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication

In Canada:
PEACOCK BROTHERS LIMITED

Since 1919, Paper and Pulp manufacturers have installed Cleveland Worm Gearing on vital equipment throughout the plant—including:

Sectional Drives and Calenders • Agitators, Beaters and Washers • Screens • Bleach Tanks • Conveyors and Elevators • Stock Chests • Pumps •

CLEVELANDS THIS WAY



CLEVELAND WORM GEAR Speed Reducers

5. That the basis of industrial operation is to hire labor at the lowest possible wage, provide working conditions only good enough to insure a high degree of efficiency and even working conditions that have no regard for the safety of the worker.

6. That men should be worked as hard as possible, as many hours as possible, in order to get the most out of them at the lowest possible cost.

7. That capital hires and fires labor without regard to the social problems that it creates and without regard to individuals.

8. That it takes no responsibility whatever for the older employees, and that it seeks, wherever possible, to employ child labor in order to still further reduce its costs and increase its profits.

Under this concept, industry is pictured as selling its products at the highest possible price that the traffic will bear without regard to the public interest, even going to the extent of creating monopolies in order to further this end.

After operating the business on this basis, fabulous profits are supposed to be distributed to a few stockholders and excessive salaries to the executives of the industries.

Industrial leaders are pictured as economic royalists and privileged princes, holding the masses in economic slavery.

If this concept were true in its entirety, there certainly would be just cause for an industrial revolution and most of us would be active in the movement.

During the past generation, tremendous changes have been made in the operation of industry and a new philosophy has been developed which is not appreciated or understood.

Old Views Need Modernization

It is of vital importance to our economy that we modernize our views of the capitalistic system and develop a better understanding of the real functions of industry.

If this old concept is not changed in the minds of the people, nothing can stop our passing into a state controlled economy.

The job of removing confusion from the minds of people is the real battle line of freedom and democracy. If the battle is not won on this front, all will be lost in the end. It is the most important responsibility facing business and industry today!

Will we drift into a totalitarian state by the German route of national bankruptcy? Or by the French route of selfishness, indifference and corruption?

There is not a manager of industry who would not respond to a call to arms to protect America and the American way of living. Will they meet this challenge of defending our country against the destructive forces of ignorance and lust for power, without having the emotional appeal that comes from a united war effort?

During the past few years there has been a tremendous effort on the part of industry to develop a better understanding of the functions and service of industry and its problems of operation. These need to be further analyzed and any abuses that may exist should be corrected. When this is done, an intensive educational program should be carried on.

If the leadership of industry accept this responsibility, you need have no worry about the future of free enterprise and democracy.

What are some of the changes that have taken place in our industrial system during the past generation?

Ownership of Industry Broadens

The ownership of industry has spread to more and more people throughout the land. By far the majority of our people have some direct ownership in business. Those who do not own stocks in our industries have an indirect interest through their savings accounts and life insurance policies.

High wages are an asset to our industrial system. This is understood and accepted by industry and is practiced quite generally within the limits of our competitive system.

Nearly half of our manufactured products are purchased by the people who produce them. Their purchasing power must be maintained on as high a level as possible.

We must keep in mind that approximately two-thirds of our population are not engaged in industry and that they consume the majority of our manufactured products. Their purchasing power must be kept in balance with that of the industrial worker.

If industrial wages and prices are too high, their purchasing power will be limited and the market for manufactured goods will be restricted.

Nearly half of our population are engaged in agriculture. Their purchasing power must be kept in balance with those engaged in industry. Maintaining this balance by taxing industry and subsidizing agriculture seems very cumbersome.

International trade also is a limiting factor on both agricultural and industrial prices.

Distribution of a Company's Income

The ultimate distribution of the income of any company is simple to trace. Generally, 60 to 70% has to be paid for materials, supplies, or fixed charges, leaving only 30 to 40% to be distributed between employees and stockholders.

Of this money available for distribution, employees have been receiving regularly from 85 to 90%. If you trace this distribution from the start of the raw materials through the various processes of conversion to the point of ultimate consumption, including transportation, you will find that this same ratio holds at every point.

Labor today is receiving from 85 to 90% of the wealth that is created. These figures are confirmed by a study made by the Department of Commerce.

The real profits of industry are represented by the money that remains from sales after paying for materials, supplies and other fixed charges. These profits have been and are now being shared between the employees and the stockholders.

The employees have been receiving 90% of these profits with only the risk that comes with the variations in our national economy. The stockholders' share varies from year to year with varying conditions and ranges from nothing up to 15% of the real profits, which, on the average, represent a return of 3 to 4% on their investment.

These facts are not understood by our economists and politicians, so you can hardly expect them to be understood by those employed in industry.

During the past generation, the hours of work have been consistently reduced. This reduction has been possible because of the intensive mechanization

of industry. Labor has shared in this improvement to an equal or greater extent than capital.

Industry's Contribution Important

Although many social organizations claim credit for this reduction, it has, to a large extent, been a voluntary movement on the part of industry. It would not have been possible if manufacturing methods had not been improved.

Scientific application of power has reduced most of the drudgery that used to exist and the majority of workmen today are operators.

Industry is quite generally carrying on a very extensive research program. The results of this have been the development of innumerable new products and improvements in existing products.

New ways are being found to produce these products more economically and they are being made available to all people.

Fear has been removed to a large extent as a means of enforcing discipline in our industrial system. There is still room for improvement in this direction.

The use of fear as a means of maintaining order and discipline is not compatible with our democratic system. We need more inspirational leadership on the part of our supervisory force.

Security is uppermost in the mind of every individual. Management has been very hesitant about giving assurances along this line.

An examination of the service records of any company would show that a great deal of security has been enjoyed by a great many people. A positive statement of desire and intent from management along this line, with emphasis on the records from the past, would help materially in settling this question in the minds of a great many people.

Suggestions on Management

Individual recognition is desired by everyone and everyone likes to feel that he is a necessary and important part of an organization and wants to know more about the part he plays in the operation of a company.

You can only obtain the best in workmanship in a friendly, appreciative atmosphere.

Has industry not advanced far enough to define and positively state that its purpose is that of a public service?

Are we not ready to declare that each company is a cooperative enterprise? The stockholders contributing of their resources for the supplying of buildings, equipments and materials for the manufacturing processes—and the employees contributing of their time and their talent for the converting of these materials into something that will be of service to the balance of society.

Each have a common interest in the success of the enterprise. There can be no basic conflict between them. If either tries to profit at the expense of the other, both will lose in the long run.

If this cooperative enterprise is to succeed, it must render a real and valuable service to its customers or the public, so that the rights and privileges of the customers must always be taken into account.

The manager of a company represents the employees as well as the stockholders in every business transaction; first, in directing their efforts in manufacturing and then in selling their services to the public.

May we offer you American and Canadian Chemical and Mechanical Wood Pulp for prompt or future deliveries.
Also sellers of Latex.

Pagel, Horton & Co., Inc.
347 Madison Avenue, New York City

Also Agents for Domsjo, Hornefors, Husum, Korsnaes, Munksund, Robertsfors, and Storvik Pulp Mills in Sweden

In view of the fact that management is the leader of both employees and stockholders, and in view of the fact that there is a question of the distribution of real profits, will not the time come when collective bargaining negotiations will be carried on between committees representing the stockholders, employees and the public?

Management would then supply all of the facts and figures relative to the operation of the business for all to consider.

Just Relationship Desired

It is the job of management to see that justice prevails between these three groups—customers, employees, and stocholders. The permanent life of a business depends upon keeping a perfect balance between these three.

Under this policy, manufacturing should be carried on as efficiently as possible, and the product should be sold to the public at a price which would be fair to them and still permit the maintenance of good wages and good working conditions, as well as a fair return to the investors.

There should be some surplus left which can be used for plant improvements in order to continue to give better service to all groups.

Plant improvements are of vital interest to both employees and stockholders. Such a program is their assurance of work and income in the future.

If a company accepts the concept that it is a cooperative organization for rendering a public service, it can go before its employees and stockholders with an industrial relations program that is founded upon bed-rock and can build relationships that will stand the test of time.

As more companies recognize these relationships, a new concept of economics will develop which can be understood by everyone, for it will be based upon fundamental truths.

Cooperative free enterprise, operating in a democracy, can out-produce and outlast any totalitarian state and can provide the best in living conditions that any economy can support.

The development of industrial understanding offers management its greatest opportunity of performing a valuable public service. Work in this direction will bring profit to both employees and stockholders. It is of even greater importance than the maintenance and development of equipment and the promotion of sales.

The future of freedom and democracy hangs in the balance. Management must accept this responsibility and do the job.

John D. Johnston Heads Salesmen

The Twenty-second annual meeting of the Salesmen's Association of the Paper Industry was held at the Waldorf-Astoria Hotel, February 17, at which the following officers were elected: president, John D. Johnston, Gaylord Container Corporation; Eastern vice-president, Norman Beardsley, Union Bag and Paper Corporation; Western vice-president, Courtney H. Reeves, Allied Paper Mills. Stanley Styles, Martin Cantine Company, was elected Eastern vice-president and Burt B. Fisher, Bergstrom Paper Company, was re-elected assistant Western vice-president. E. C. Merchant was re-elected secretary.

For outstanding service to the association during the year, E. R. Lyman, Missisquoi Corporation, and Ben K. Babbitt, Brown Company, were presented with engraved certificates and traveling bags.

Fourteen past presidents of the association were honored and presented with medallions bearing the initials of the association. The recipients and the terms of their office were: George K. Gibson, 1920-1921; Howard H. Reynolds, 1921-1923; Joseph L. Fearing, 1923-1925; Walter E. Perry, 1925-1927; James H. Coy, 1927-1929; Samuel C. Knode, 1929-1931; Harold R. Knott, 1931-1934; William L. Raymond, 1934-1935; Creighton W. Whiting, 1935-1936; Reginald C. Johnson, 1936-1937; Edson R. Lyman, 1937-1938; John T. Burruss, 1938-1939, and Hugh N. Phillips, 1939-1940. Medallions were also presented to Warren B. Bullock, the first secretary of the association, to E. O. Merchant the present secretary, and to John R. Diggs who retired on February 18 as president.

Annual Luncheon Largely Attended

The annual luncheon of the Salesmen's Association of the Paper Industry was held in the Grand Ballroom of the Waldorf-Astoria Hotel, February 18 with some 1400 present.

Seated at the speakers table were the following: John L. Riegel, president, American Paper and Pulp Association; A. B. C. Drew, president, American Pulp and Paper Mill Superintendents' Association; E. W. Tinker, executive secretary, American Paper and Pulp Association; J. R. Diggs, president, Salesmen's Association of the Paper Industry; J. D. Johnston, vice-president, Salesmen's Association of the Paper Industry; C. H. Reeves, vice-president, Salesmen's Association of the Paper Industry, Commander Thomas Dunlop Galbraith of the Royal British Navy; A. E. Cadman, secretary, Canadian Pulp and Paper Association; Dr. E. O. Merchant, secretary, Salesmen's Association of the Paper Industry; G. K. Gibson, past president, Salesmen's Association of the Paper Industry; W. E. Perry, past president, Salesmen's Association of the Paper Industry; and J. H. Coy, past president, Salesmen's Association of the Paper Industry.

President John R. Diggs presided and introduced as the first speaker, John L. Riegel, president of the Riegel Paper Corporation and president of the American Paper and Pulp Association.

Address of John L. Riegel

It is not often that I have the privilege of addressing the Salesmen of the paper industry and I am particularly glad to have the opportunity of doing so at the present time.

The dangerous present situation will require the country to produce on an enormously large scale. Even last year volume in the paper industry was substantially higher than ever before and in 1941 it undoubtedly will be still higher.

According to the most careful analyses of the American Paper and Pulp Association the paper industry has the capacity to meet all war and consumer needs.

At any time, however, the users of paper could temporarily choke the mills with orders. This would be followed by a slack period and we would have the type of serious economic disturbance so harmful to the industry and so contrary to the best interests of the whole country.

The danger is psychological and management is

dependent on your knowledge of customer psychology to prevent its occurrence.

Make sure that your customers maintain adequate inventories, see that they buy regularly and not speculatively in excess of their consumption.

You and your customers will do a large volume of business this year. All will gain if it is done on a sane and steady basis.

SIR WILLMOTT LEWIS SPEAKS

The principal guest speaker, Sir Willmott Lewis, K.B.E., Washington correspondent of the London *Times*, was unable to be present through illness and Commander Thomas Dunlop Galbraith of the British Royal Navy, delivered the chief address. The theme was Britain's position in the European conflict. The speaker declared that only through the cooperative effort of all English speaking peoples of the world could a just and permanent peace be achieved.

Paper and Twine Club

The only large program of entertainment of the entire convention week took place on Wednesday evening, February 19, in the grand ballroom of the Hotel Waldorf-Astoria, New York. The occasion was the sixth annual banquet of the Paper and Twine Club. Over five hundred attended.

Five Paper and Twine Club dignitaries appeared before the microphone on the stage, and their entire comment lasted only several minutes.

Jack Wittrock, Paragon Paper Company, Cincinnati, O., former association president, introduced "Oscar," the famous chef of the hotel. He recalled that he also served the American Paper and Pulp Association at the "old Waldorf." John L. Richey, Paper and Twine Club secretary, presented Charles Walden, member, with a wedding anniversary gift on the occasion of Mr. and Mrs. Walden's celebration of that event on the same day as the banquet.

T. Floyd Smith, Jr., Louisville Paper Company, Louisville, Ky., and association president, welcomed the guests and introduced Stanley H. Andrews, chairman of the banquet committee, who after announcing that "our speeches are over" introduced Morey Amsterdam, master of ceremonies.

The all-star vaudeville show which followed immediately, included: Elaine Seidler's Revue, Gene Marvey, Three Eltons, Lillian Dixon, Three Wiles, Steve Evans, Paul Sydell and Spotty, Six Honeys, Joe Moss and Music.

The banquet committee consisted of: Chairman, Stanley H. Andrews, H. P. Andrews Paper Company, New York; Vice Chairman, E. F. "Bud" Miles, Crocker-McElwain Company, New York; Treasurer, H. P. Price, A Price & Son, New York; Secretary, Alfred S. Walden, Walden, Sons & Mott, Inc., New York; Dan Mahony, Lily-Tulip Cup Corporation, New York; Arthur W. Pohlman, A. W. Pohlman Paper Company, New York; James F. Levens, Geo. W. Millar & Company, New York.

Those on the reception committee were: George S. Johnston, Champion Paper & Fibre Company; C. J. Wittrock, Paragon Paper Company; Russell S. Madden, American Writing Paper Corporation; George Goodsir, Mid-States Gummed Paper Company; Thomas Goulard, Walker-Goulard-Plehn Company; Donald Macauley, S. D. Warren Company; Adolph Warshow, Majestic Paper Corporation; Jacob Nacht, Union Card & Paper Company; John A. Howe, F. W. Anderson & Company; Leo Greenebaum, Willmann Paper Company; Fred Schlosser, Schlosser Paper Corporation; L. E. Sayre, Canfield Paper Company; John D. Johnston, Gaylord Container Company; George W. Sisson, 3d, Racquette River Paper Company; Frank W. Vaughan, Tested Papers, Inc.; Simon Walter, Philadelphia; Frank H. Purington, Eastern Corporation; Elmer E. Cole, Henry Lindenmeyr & Sons; E. J. Durkin, O. & W. Thum Company; Robert H. Ziegler, National Paper Trade Association; Fred A. Mann, Dennison Manufacturing Company.

Officers of the association are: President, T. Floyd Smith, Jr., Louisville Paper Company, Louisville, Ky.; vice president, Stanley O. Styles, Martin Cantine Company, New York; secretary-treasurer, John L. Richey, Cincinnati, O.

Tissue Association

The Tissue Association's annual meeting was held on Tuesday, February 18, at the Hotel Waldorf-Astoria, New York. Re-elected as president was J. M. Conway, president of the Hoberg Paper Mills.

Dwight G. W. Hollister, president, A. P. W. Paper Company, was re-elected vice president, and Sam Wishnick, Park Tissue Mills, was renamed treasurer. Ross A. Fife will continue as executive secretary.

The following board of governors was elected: A. B. Hansen, Northern Paper Mills; F. W. Plowman, Scott Paper Company; B. I. Reider, Victoria Paper Mills; H. Larsen, Crystal Tissue Company; B. F. Picola, Gotham Tissue Corporation; Norman Seagrave, Port Huron Sulphite Paper Company; W. Servotte, Bay West Paper Company; W. E. McIntyre, McIntyre Brothers Paper Manufacturing Company; William Shafer, Flower City Tissue Mills; George Stuhr, Southern Kraft Corporation; R. B. Stevens, Stevens & Thompson Paper Company; R. W. Sweet, Sweet Brothers Paper Manufacturing Company.

R. W. Sweet was elected chairman of the jumbo roll division; William Shafer, chairman of the wrapping tissue division; George Stuhr, chairman of the paper towel division; R. B. Stevens, chairman of the roll toilet tissue division; Dwight G. W. Hollister, chairman of the interfolded toilet tissue division.

After his re-election, Mr. Conway remarked that "no one individual or firm is big enough to live unto himself or itself." He stressed the acceleration in the rate of change in the economic and social life of the country, and added that these rapid changes and the probable increase of Government control over business make industry cooperation more necessary than at any time in the past.

The association announced that an *Industry Manual* will be distributed in the near future. The manual is part of Mr. Conway's "industry program", and in it there will be defined what members may expect of the association and how they may obtain the services they expect.

Paper Mill Supply Dealers Dine

The New York Association of Dealers in Paper Mills' Supplies, Inc., celebrated its forty-first birthday with its thirty-third annual banquet the evening of February 18 at the Hotel Commodore. About three hundred members and guests gathered to renew old friendships and make new friends. At the start of the dinner a huge birthday cake, sparkling with the appropriate number of candles, was placed before the association officials with accompaniment of spot-

light and music. A score of prizes went to the holders of lucky numbers. Included were theater tickets, boxes of golf balls and packages of "good cheer" by the brothers Haig & Haig. A dozen well chosen specialty acts kept the crowd in good humor.

Tables were reserved by the following individuals and organizations:— D. Benedetto, Inc., Better Packages, Inc., Robert Blank, Alfred Bloch & Co., Brooklyn Paper Stock Corporation, Charles J. Browne, Cantasano Brothers, Inc., A. Cappadona & Co., John H. Carlo & Sons, Inc., James Carrano's Sons, Inc., Castle & Overton, Inc., Darmstadt, Scott & Courtney, Derrico Company, Inc., Economy Baler Company, Eolio Corporation, Federal Waste Paper Corporation, S. J. Fisher, Inc., James T. Flannery Company, Inc., Gaccione Brothers & Co., Inc., Jacob P. Galewitz, Giove Company, Inc., Louis Gottlieb & Co., W. J. Green Company, Inc., Harrisburg Waste Paper Company, Daniel M. Hicks, Inc., Hicks-Costarino Company, Inc., E. J. Keller Company, Inc., Loumar Textile By-Products, Inc., N. Mastronardi Sons, Inc., Melrose Salvage Corporation, George W. Millar & Co., Inc., Minnich Machine Works, Alfred J. Moran, Prospect Street Paper Stock Company, Inc., Bag Processing Corporation, George W. Reed, Ruberti Salvage Company, Shapiro-Contansano Waste Materials, Inc., William Steck & Co., Inc., Sterling Mill Supply Company, Inc., Harry Stone, Toga Paper Stock Company, Inc., Valva Paper Stock Company and Wilson Paper Stock Company, Inc.

The banquet committee consisted of Walter H. Martens, chairman; John L. Nielsen and Arthur Rosenfeld.

The officers of the association are as follows:— Arthur Rosenfeld, president; John L. Nielsen, first vice-president; Gus R. Holm, second vice-president; Alfred J. Moran, secretary-treasurer.

Glazed and Fancy Paper Association

The annual meeting of the Glazed and Fancy Paper Association was held on Monday, February 17, at the Hotel Commodore, New York. Leo R. McDevitt, Blackstone Glazed Paper Company, was at this meeting elected president of the association. He succeeds Harry B. Conklin, Louis Dejonge & Co.

The vice presidents elected were: John N. Hazen, Hazen Paper Company, manufacturing division; George J. E. Buell, Chas. Williams & Co., merchandising division. Arthur A. Thomas, 902 Union Trust Building, Providence, R. I., is executive director of the association.

Elected as members of the executive committee were: Mr. Conklin, manufacturing division, for the unexpired term of Mr. Hazen, expiring February, 1942; James T. Cronk, Hampden Glazed Paper and Card Company, manufacturing division, for a term of two years, expiring February, 1943; Charles H. Hoffman, Hughes & Hoffman, merchandising division, for a term of two years, expiring February, 1943.

An arbitration committee, composed of the following, was also elected: Chairman, Ralph N. Fowler, Hampden Glazed Paper and Card Company; Sam R. Fry, Wyomissing Glazed Paper Company; William B. Snow, Middlesex Products Company; William E. Madden, Chas. Williams & Company; Arthur J. Wagner, Holyoke Card and Paper Company.

Guest Speaker Walter P. Miller, representing the National Paper Box Association, proposed at the session that his group and the glazed and fancy organization cooperate in an advertising campaign. The executive committee was directed to further discuss the proposal.

Sulphite Paper Mfrs. Association

John Stevens, Jr., vice president, Marathon Paper Mills Company, Rothschild, Wis., was elected general chairman of the Sulphite Paper Manufacturers Association, at the association's annual meeting held on Monday, February 17, at the Hotel Waldorf-Astoria, New York.

At the same time, W. E. McIntyre, Dexter Sulphite Pulp and Paper Company, was elected to the board of governors.

The following officers were re-elected: George Stuhr, Southern Kraft Corporation, vice chairman unbleached group; Fred W. Cole, Fraser Industries, Inc., vice chairman bleached group; Rufus L. Sisson, Jr., Racquette River Paper Company, vice chairman manila group; Edgar W. Kiefer, Port Huron Sulphite & Paper Company, vice chairman machine glazed group. All of these officers were also re-elected to the board of governors.

The other members re-elected to the board were: John E. Alexander, Nekoosa Edwards Paper Company; Walter B. Merlin, Hollingsworth & Whitney Company; Harold O. Nichols, Crown Zellerbach Corporation; Leroy F. Porter, Northwest Paper Company; Rufus I. Worrell, Mead Sales Company.

Paper Makers Advertising Association

The Twenty-sixth annual meeting of the Paper Makers Advertising Association was held at the Hotel Lexington, New York, February 17.

Holley Cantine, Lee Hulett and Robert McCormack, acting as a nominating committee, presented the following slate of officers for 1941, all of whom were unanimously elected: president, M. A. Park, The Marvellum Company; vice-president, Richard Faulkner, International Paper Company; vice-president, Gene Colvin, Appleton Coated Paper Company; secretary, Bradley Stafford, Strathmore Paper Company; treasurer, Flloyd Triggs, Riegel Paper Corporation.

C. R. Larrabee, managing editor of Printers Ink Publications, addressed the meeting. His topic, "Advertising—the Sixth Column", evoked unusual interest and discussion. Flloyd Triggs of the Riegel Paper Corporation retired after three terms as president, and reported that the association's membership and financial position had both continued to show steady growth and are now at the highest point in many years.

Newsprint Manufacturers Association

The adoption of revised articles of organization and the election of officers featured the annual meeting of the Association of Newsprint Manufacturers of the United States on Wednesday, February 19, at the Hotel Waldorf-Astoria, New York.

Among other things, the new articles provide for a change of the organization's name from the Association of Newsprint Manufacturers of the United States to the Newsprint Manufacturers Association of the United States. The new articles also displace the title of chairman, vice chairman and advisory committee with—respectively—president, vice

president and executive committee. Another provision states that the offices of secretary and treasurer shall be elected ones.

A. L. Hobson, St. Croix Paper Company, was re-elected president. Samuel Pruyn, Finch, Pruyn & Co., Inc., 1940 vice chairman, was named a member of the executive committee. J. D. Zellerbach, Crown Zellerbach Corporation, was rechosen vice president.

The executive committee appointed R. S. Kellogg as treasurer, and Louis W. Adams, who until now had been assistant secretary, was appointed secretary.

Besides the election of Mr. Pruyn, the association re-elected the following members of the executive committee: George D. Bearce, Maine Seaboard Paper Company; Gordon H. P. Gould, Gould Paper Company; R. H. M. Robinson, Minnesota and Ontario Paper Company; John H. Smith, Hawley Pulp and Paper Company.

Pulp Consumers Form Association

At a meeting of representatives of paper mills which purchase wood pulp held at the Waldorf-Astoria on Wednesday, February 19, action was taken to form a permanent association to be known as the Association of Pulp Consumers. This action was the result of a feeling among the pulp consumers that only through united action could they be assured of an ample supply of wood pulp at fair prices. It was pointed out at the meeting that in spite of the statement that the present high prices were a result of a shortage of pulp, that nearly half a million tons of domestic wood pulp were exported during 1940. The new association, although it plans to operate separately from the American Paper and Pulp Association, endorses the program and policies of the American Paper and Pulp Association. Headquarters will be established shortly.

Directors of the new association include:—J. N. Bergstrom, Bergstrom Paper Company, Neenah, Wis.; Douglas Crocker, Crocker-Burbank & Co., Fitchburg, Mass.; D. G. Driscoll, Sorg Paper Company, Middletown, Ohio; G. K. Ferguson, Watervliet Paper Company, Watervliet, Mich.; H. H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; D. G. W. Hollister, A. P. W. Paper Company, Albany, N. Y.; Robert Nelson, Glassine Paper Company, West Conshohocken, Pa.; W. I. Osborne, Jr., Cornell Wood Products Company, Chicago, Ill.; J. F. Ryland, Standard Paper Manufacturing Company, Richmond, Va.; G. R. Wallace, Fitchburg Paper Company, Fitchburg, Mass.

Specialty Paper and Board Affiliates

The general and group meetings of the Specialty Paper and Board Affiliates were held on Wednesday, February 19, at the Hotel Waldorf-Astoria, New York. At these sessions, the executive committee and the group chairmen were chosen. The election of the president will take place, as usual, at a meeting of the executive committee at the same hotel during the third week of March. Paul R. Bachman, Riegel Paper Corporation, New York, is now president of the group.

The association elected the following as members of the executive committee: Mr. Bachman; S. B. Sutphin, Beveridge Paper Company, Indianapolis, Ind.; Louis Vose, Hollingsworth & Vose Company, East Walpole, Mass.; Harry S. Lewis, J. P. Lewis Company, Beaver Falls, N. Y.; Arthur Waring, Port Huron Sulphite and Paper Company, Port Huron, Mich.; Stewart Foster, Foster Paper Company, Inc., Utica, N. Y.; George E. O'Connor, Mohawk Paper Mills, Inc., Cohoes, N. Y.

G. D. Cook, 122 East 42nd Street, New York, is secretary-treasurer.

Group chairman were elected as follows: Mr. Bachman, file folder; Mr. Sutphin, bogus bristol; Mr. Vose, wallet and patch; Mr. Lewis, jacquard; Ted Lyman, Missisquoi Corporation, Sheldon Springs, Vt.; Mr. Foster, lined board; Mr. O'Connor, special papers.

E. W. Tinker, executive secretary of the American Paper and Pulp Association, dwelt in a brief talk before the association on the benefits of membership in associations and also called attention to Washington legislation of interest to the industry.

Bristol Board Manufacturers

Joseph E. Holmes, Chemical Paper Manufacturing Company, Holyoke, Mass., was on Wednesday, February 19, elected chairman of the Bristol Board Manufacturers Group at the group's general meeting which took place at the Hotel Waldorf-Astoria, New York.

Elected as vice chairman was Kendall Wyman, Champion Paper & Fibre Company, Hamilton, O. James L. Ritchie, 122 East 42nd Street, New York, is the association's secretary-treasurer.

The following members of the executive committee were elected: R. I. Worrell, Wheelwright Papers, Inc., New York; James F. Ryland, Standard Paper Manufacturing Company, Richmond, Va.; Norman Harrower, Linton Brothers & Company, Fitchburg, Mass.; Edward Bailey, Hollingsworth & Whitney Company, New York; B. C. Hopper, Hopper Paper Company, Taylorville, Ill.; Carlton W. Smith, Miamisburg, O.; R. M. Swaney, Franklin Paper Company, Holyoke, Mass.

U. S. Pulp Producers Association

The eighth annual meeting of the United States Pulp Producers Association was held at the Waldorf-Astoria on February 16, and the following were elected to the Executive Board for 1941:

Regional Directors: New England, Amor Hollingsworth, Penobscot Chemical Fibre Company; Middle Atlantic: Norman W. Wilson, Hammermill Paper Company; South: Clyde B. Morgan, Rayonier Inc.; Lake States: Folke Becker, Rhinelander Paper Company; West Coast: Robert B. Wolf, Pulp Division, Weyerhaeuser Timber Company.

Directors at Large: Ossian Anderson, Puget Sound Pulp and Timber Company; Downing P. Brown, Brown Company; J. M. Conway, Hoberg Paper Mills; Stuart B. Copeland, The Northwest Paper Company; Walter A. Starr, Soundview Pulp Company; Alexander Calder, Union Bag and Paper Corporation.

Executive Director: Oliver M. Porter, 122 East 42nd street, New York.

Groundwood Paper Association

At the annual meeting of the Groundwood Paper Manufacturers Association at the Waldorf-Astoria Hotel, February 17, there were no speakers, but instead there was a general open discussion of market and business conditions. The following officers were elected:—E. G. Murray, St. Regis Paper Company,

president; W. C. Shorter, International Paper Company, vice-president; R. E. Canfield, 122 East 42nd street, New York, executive vice-president; C. K. Andrews, Blandin Paper Company, vice-president; Aubree Crabtree, Fraser Industries and W. A. Munro, Flambeau Paper Company, Board Members; E. O. Merchant, 122 East 42nd street, New York, secretary and treasurer.

Writing Paper Mfrs. Association

At the 80th annual meeting of the Writing Paper Manufacturers Association, held on Tuesday, February 18, 1941, the following officers were elected: president, A. C. Gilbert, Gilbert Paper Company; vice-president, H. H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; vice-president, J. D. Zink, Strathmore Paper Company, West Springfield, Mass.; executive secretary and treasurer, M. C. Dobrow, 122 East 42nd street, New York.

Members of the Executive Committee: H. R. Baldwin; M. D. Bardeen; G. H. Beckett; D. D. Coffin; Bruce Crane; W. J. Garrity; H. H. Hanson; T. A. Hendry; R. S. Madden; R. F. McElwain; E. A. Aberweiser; A. C. Remley; F. H. Savage; W. B. Zimmerman; J. D. Zink.

Kraft Paper Association

At the annual meeting of the Kraft Paper Association held at the Waldorf-Astoria Hotel, on February 17, the following officers and members of the Executive Committee were elected:

Officers: Edward R. Gay, president; George B. Gibson, vice-president.

Executive Committee Members: J. E. Alexander; W. H. Anders; E. A. Charlton; J. H. Cowhill; Gifford Henderson; W. J. Henry; R. A. McDonald; C. R. McMillen; J. R. Miller; J. L. Stille, and N. S. Stone.

Counsel: I. B. Osceas.

Executive Secretary-Treasurer: Charles W. Boyce, 122 East 42nd street, New York.

Cardboard Manufacturers Association

The Cardboard Manufacturers Association at its annual meeting, Tuesday, February 18, elected Malcolm B. Lowe, Lowe Paper Company, Ridgefield, N. J. as president and F. C. Heinritz, Appleton Coated Paper Company, Appleton, Wis. as vice-president. Joseph A. Moses, Falulah Paper Company, Fitchburg, Mass., was elected chairman of Clay Coated Blanks and Miscellaneous Cardboards; M. A. Park, Marvellum Company, Holyoke, Mass., was elected chairman of Photographic Mount Group and F. C. Heinritz, Appleton Coated Paper Company, Appleton, Wis., was elected chairman of the Clay Coated Tag Group. James L. Ritchie was elected secretary-treasurer.

Blotting Paper Association

All officers of the Blotting Paper Manufacturers Association were re-elected for 1941 on Monday, February 17, at the group's annual meeting held at the Hotel Waldorf-Astoria, New York. Henry S. Mead, Wrenn Paper Company, Middletown, O., is president of the Association. The vice president is U. S. Bratton, Jr., of the Rochester Paper Company, Rochester, Mich., and the secretary-treasurer is James L. Ritchie, 122 East Forty-second street, New York.

Pulpwood Men Elect Officers

At a recent meeting of the Southern Pulpwood Conservation Association, whose headquarters are at 1501 First National Bank Building, Ga., W. J. Damtoft was elected president and A. H. Stien, vice president. These officers with C. O. Brown, E. A. Sterling and M. S. Kahler for the executive committee.

Directors were chosen as follows:—T. W. Earle, North Carolina; W. D. Comings, South Carolina; M. S. Kahler, Georgia; A. H. Stier, Florida; W. E. Penfield, Alabama; P. M. Garrison, Mississippi; C. O. Brown, Louisiana; J. E. McCaffrey, Arkansas; C. E. Smith, Texas; W. P. Bullock, Tennessee; E. A. Sterling, Virginia; R. H. Laftman, At Large; W. G. Schwab, At Large and J. H. Allen, At Large

The following were chosen as vice presidents:—Hugh Camp, North Carolina; C. P. Cuthbert, South Carolina; K. S. Trowbridge, Georgia; Geo. L. Snowden, Florida; H. S. Galloway, Alabama; P. N. Howell, Mississippi; A. G. Curtis, Louisiana; Earl Porter, Arkansas; E. J. Downey, Texas; J. H. Keener, Tennessee, and R. F. Bower, Virginia.

Holyoke Card Co. Improves Plant

F. Allan Barr, sales manager of the Holyoke Card and Paper Company announces that an extensive modernization program and other manufacturing and service facilities is at the present time being undertaken by the Holyoke Card and Paper Company of Springfield, Mass.

To meet greater production requirements, new equipment of latest design is being installed in the finishing department, and all machinery throughout the mill is being checked and reconditioned. Several lines are being discontinued, others revamped, and new lines to meet customer demands are under consideration.

With this new equipment for manufacturing cover papers and specialty papers of all kinds, and with the demand for its popular lines showing a steady increase, the company is looking forward to one of the best years in its history.

Glassine and Greaseproof Association

The entire executive committee of the Glassine and Greaseproof Manufacturers Association was re-elected on Wednesday, February 19, at the association's annual meeting held at the Hotel Waldorf-Astoria, New York.

The executive committee includes: Chairman, Folke Becker, Rhinelander Paper Company; Olaf Hedstrom; Paul E. Hodgdon; Harry B. Kuhns; Paul F. Moore; Robert F. Nelson; John L. Riegel.

Thomas J. Burke, 122 East 42nd street, New York, is secretary-treasurer of the association.

American Waxed Paper Assn.

At the annual meeting of the American Waxed Paper Association, held at the Waldorf-Astoria Hotel, New York, on February 18, the following board of governors was elected:

Donald A. Snyder, one year term, and the following for terms of two years: H. O. Nichols; D. C. Hurlburt; Van H. Wilshire; J. E. Edelstein, and Karl Zimmer.

Secretary, George J. Lincoln, Jr., 1532 Lincoln-Liberty Building, Philadelphia, Pa.

Technical Men Hold 26th Annual Convention

W. H. Swanson Of Kimberly-Clark Corp. Is Reelected President—Papers Of Unusual Degree of Excellence Are Presented At Various Sessions — Official Reports Reflect Organization's Fine Condition.

Walter H. Swanson, staff superintendent of sulphite, of the Kimberly-Clark Corporation, Kimberly, Wis., was reelected president and Ralph A. Hayward, president of the Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., was reelected vice president of the Technical Association of the Pulp and Paper Industry at the twenty-sixth annual convention held at the Roosevelt Hotel, New York, February 17-20. The following were elected to serve on the executive committee for a period of three years: —Pierre Drewsen, chemical engineer, Hinde & Dauch Paper Company, Sandusky, Ohio; Hugh H. Hanson, president, W. C. Hamilton & Sons, Miquon, Pa.; Brydone D. Millidge, vice president and general manager, Alliance Paper Mills and Don Valley Paper Company, Ltd., Merritton, Ont.; Gunnar W. E. Nicholson, production manager in charge of Mobile, Panama City and Georgetown Mills, Southern Kraft Corporation, Panama City, Fla. R. G. Macdonald continues as secretary-treasurer. The speakers at the annual luncheon were D. C. Everest, who spoke on the "National Defense and the Paper Industry" and Elmer W. Peterson, chief of the Bureau for the Associated Press of Stockholm, Sweden, who spoke on "The Viking's Return."

President's Address

President Swanson in delivering his annual address before the opening session of the convention spoke as follows:—

One of the duties which the president of your association is required to perform is the presentation of an address at the annual meeting covering "such subjects as are of value to the association." After giving some thought as to what subjects would fall in this category, I have concluded that for a short address a résumé consisting of my general comments on some of the activities of the association during the year just passed should be pertinent. Further, some observations as to the status of the association, the paper industry, and the technical men in the industry may have some point.

W. H. Swanson, President

R. G. Macdonald, Secretary-Treasurer

Membership and Finances

First, let us consider the situation as concerns the association's membership. We find that during the last year there has been the usual slow and non-spectacular growth experienced during the last few years. This is probably all that can be expected since the organization is now quite mature and already includes in its membership a majority of the technical men in the industry.

Financially, the association continues in its usual sound position. It still operates pretty well within the limits of its annual budget. Accumulation of funds over those required for prosecution of its program has not been excessive during the last year.

The association is fortunate in having a very able and conscientious finance committee. Its members are continuously alert to the market situation as concerns the securities which represent the association's reserve fund. They have established a system of monthly check-up as concerns the market values of our securities and through its use should be able to maintain a healthy and flexible financial position.

Publications

The policy in connection with publications activities has not changed materially within the last year. However, during the year, a difficult situation has developed involving the publication of literature abstracts in the Paper Trade Journal. This material has become so voluminous that it is not feasible to continue the present practice, since it requires too much of the journal space allotted to the association

for its use. As a result your executive committee has approved a separate publication containing only abstracts and issued quarterly to the membership.

RESEARCH PROJECT

There has not been any material change in the situation involving association support of research projects. About the same expenditure was made for this purpose last year as during the preceding year.

As originally set up, it was intended that the research program of the association would originate in the various committees and divisions in the form of requests for specific studies to develop information needed by them in the prosecution of their programs. While some committees have made use of this facility, its use has not been too general. Instead, research projects have been originated and prosecuted by individual workers, having, of course, received the approval of the research promotion committee and appropriation of the necessary supporting funds by the executive committee.

Because of the drift from the original intent of the program, the executive committee is giving this matter consideration.

COMMITTEES AND LOCAL SECTIONS

The functioning of the several divisions and their associated committees continues about the same as in previous years. We find that those committees most directly involved in the development of tests and standards have been quite continuously active. On the other hand, in many instances, those committees having to do more directly with manufacturing processes have been active mainly in the periods immediately prior to and during the annual and fall meetings. Perhaps this is as it should be.

It appears that local section activities are becoming more and more a major feature in the activities of the national association. Because of this, it appears that the executive committee should develop a unified policy in connection with its relationship to the several local sections. Suffice it to say that the executive committee is studying this problem.

In passing, it is proper that the Pacific Coast section be complimented and thanked for its efforts in connection with the splendid management of the fall meeting program at Seattle. That section has pointed the way, I believe, for the handling of future fall meetings.

This, I believe, covers the general situation as concerns association affairs during the last year. Let us now examine the immediate future and see what the prospects are for the industry, the association, and the technical men of the industry.

INDUSTRIAL CONDITIONS

The probability is that the industry will enjoy a good year this year as far as volume of production is concerned. This should eventuate because of the general business acceleration resulting from the governmental rearmament program. Obviously, the paper industry, in general, will feel no great direct effect from this program in the way of increased volume, since it is not a war industry.

It is not clear as to just what the situation will be with respect to pulp availability. As yet, no acute shortage has been indicated. This is in part due to the accumulation of large inventories by importation during the first quarter of last year; also, increased pulp production from mills in the United States and Canada has had its effect.

If the assumption, made earlier, that we would experience an increased volume of paper business this year proves correct, there is the probability that a definite pulp shortage will eventuate during the latter part of the year. This statement assumes, of course, that the European situation will remain unchanged as concerns pulp imports. Should there be a change in this factor, the picture as concerns pulp might be very different.

Considering the association's activities during the coming year, they will probably parallel, in general, those of the year just passed. The fall meeting will be held at Ann Arbor, Mich., under the sponsorship of the Kalamazoo section. I am sure that this will prove to be a very interesting meeting and one very worthwhile attending.

There is a likelihood that the membership in the association will remain static or drop off somewhat during the year. This will result from the loss of foreign memberships and, also, from the loss of members in this country due to entrants into military service.

POSITION OF THE TECHNICALLY TRAINED MAN

The position of the technical man in the industry will probably increase in importance. There is no question but that the effect of the war industries program will be felt by our industry particularly with respect to maintenance materials. The necessities of the war industries will obviously receive first consideration, and industries such as ours will have to learn to do without certain materials which have been in normal use, and get along with substitutes. In this field, the specialized training of the technical man will prove of great value.

In closing, may I thank the secretary-treasurer of the association, Mr. Macdonald, and the members of the executive committee for their effective efforts in conducting the affairs of the association during the last year.

Report of the Secretary-Treasurer

R. G. Macdonald, the secretary-treasurer of the association delivered his annual address as follows:

The year 1940 of the Technical Association of the Pulp and Paper Industry was another year of steady progress in giving service to its members.

MEMBERSHIP

There were 198 individual members elected in 1940. Eighty-five resigned or were dropped from the membership roster. On December 31, 1940 the total individual membership was 1794.

There were 4 corporate and 3 sustaining members elected. Six corporate and 6 sustaining members resigned. The corporate membership on December 31, 1940 was 80 and the sustaining membership was 89.

The following companies became corporate members:

Chesapeake-Camp Corporation, Hawley Pulp & Paper Company, The Mysore Paper Mills, Ltd., Schmidt & Ault Paper Company.

The following companies became sustaining members: Dow Chemical Company, Socony-Vacuum Oil Company, Sinclair & Valentine Company.

NECROLOGY

The Association lost through death the following members: F. L. Barstow, C. E. Curran, G. M.

Fowler, R. O. Harper, W. H. Mason, G. W. Miles, F. W. Motschman, O. O. Roberts and A. D. Wood.

Special Reports on Manufacturing Problems

Throughout the year the association office handles a large number of technical and other inquiries relating to pulp and paper manufacture and to the industry. The office also assisted a number of committees and members by conducting surveys on manufacturing details and technology. As a result of this work a number of special reports were prepared and distributed to our corporate members and to those who supplied information.

The special reports issued in 1940 were:

No. 300—Paper Formation on Cylinder Machines; No. 301—Storage Chests Protective Coating; No. 302—Drying Rates for Paperboard; No. 303—Pulp Evaluation; No. 304—Standard Humidity Conditions for Paper Testing; No. 305—Coated Paper Splitting and Peeling in Printing; No. 306—Opinions on 50 vs. 65 Per Cent Relative Humidity for Testing; No. 307—APPA Relative Humidity Survey; No. 308—Recovery of Heat in Sulphite Pulp Mills; No. 309—Starch Application to Paperboard for Gloss Ink Printing; No. 310—Dust Collecting from Converting Machines; No. 311—Variation in Beating Characteristics of Sulphite Pulps; No. 312—Corrosion in Sulphate Pulp Mills.

Employment

Employment conditions for engineers, superintendents, and chemists have been improving constantly, partly due to the Draft but in more cases due to improved business conditions. Executives are urged to utilize the services of the Technical Association in obtaining competent employees.

Constitution and Bylaws

Following the approval of the Constitution and Bylaws at the 1940 annual meeting the necessary additional approval was obtained from the membership at large.

Fall Convention

The fall or summer meeting of the association was held at Seattle, Wash., on August 20-23, 1940 with the Olympic Hotel as headquarters. There was an attendance of about 600. A detailed report of this meeting appeared in the Paper Trade Journal of August 29, 1940. An outstanding program of papers, mill and wood visits, banquets, etc., was arranged by the local committee under the able chairmanship of G. S. Brazeau of the Everett, Wash., mill of the Weyerhaeuser Timber Company.

The 1941 fall meeting will be held at the University of Michigan, Ann Arbor, Mich., on September 16-19, 1941.

Research Promotion

Four appropriations were approved by the executive committee to finance the following projects:

No. 16—$250 to the Paper Testing Committee to prepare a negative for the printing of charts to be used for the estimation of dirt in paper or pulp under the direction of John Graff of the Institute of Paper Chemistry.

No. 17—$1200 to the Fundamental Research Committee to develop a practical process for the isolation of holocellulose for making high grade alpha cellulose, etc., under the direction of George J. Ritter, Forest Products Laboratory.

No. 18—$1000 to the Fundamental Research Committee to determine quantitatively the relation of lignin and associated substances to the measurable properties of fiber products under the direction of E. C. Jahn, New York State College of Forestry.

No. 19—$650 to the Fundamental Research Committee for the study of oxycelluloses to determine new chemical methods of determining the mode of oxidation in any given case under the direction of C. B. Purves of the Massachusetts Institute of Technology.

Publications

Each member received the following publications: Bibliography of Papermaking, (March); Technical Association Papers (752 pages), July; Year Book, (September); TAPPI Data Sheets and TAPPI Standards (Additional sheets); Paper Trade Journal, (weekly).

The Lockwood Trade Journal Company contributed financially to the publication of Technical Association Papers and Henry J. Berger, editor of the Paper Trade Journal assisted in the preparation of the technical articles published in the Papers and in the Paper Trade Journal. Nineteen forty-one marks the twentieth year of the arrangement between the association and the Lockwood Trade Journal Company whereby a large proportion of the association's technical articles are published in the Journal. Each member of the Association has during this period received an annual subscription to the Paper Trade Journal for which $4.00 of each member's dues is paid. The association is indebted to the staff of the Journal for its cooperation and many courtesies and to G. S. Macdonald, president of the Lockwood Trade Journal Company for his sympathetic encouragement of the association in its various publication ventures. These in the past have included Paper Testing Methods, Papermaking Materials, Bibliography of Microscopy and the Bibliographies of Papermaking and Patents from 1900 to 1937.

C. J. West of the Institute of Paper Chemistry prepared all of the annual Bibliographies of Papermaking from 1900 to date.

Additional pages of TAPPI Data Sheets and Standards were issued during the year. These are kept in the loose-leaf binders by the members.

Local Sections

No new local sections were organized during the year although a new group caled the Proposed Maine-New Hampshire Section held its first meeting on November 25-26, 1940 at Orono, Maine. About 150 attended. The New England, Delaware Valley, Empire State, Ohio, Kalamazoo Valley, Lake States and Pacific Sections met at frequent intervals and had well attended meetings and good programs. The Pacific Section sponsored the national fall convention of the Association at Seattle in August. The meeting of these sections is reported in the Paper Trade Journal and the TAPPI Year Book.

Constitution and Bylaws

The Constitution and Bylaws which were approved at the 1940 annual meeting of the Association were adopted by the membership in the spring through a mail ballot.

Color Charts for Fiber Analysis

The Association contributed $3000 to the fund co-financed by the American Paper and Pulp Association

and the Institute of Paper Chemistry for the publication of a bound volume of Color Charts to be used in fiber identification work. The sale of these books has been good and about one-half of its contribution has been returned to the Association.

Fiber Seminar

In June fifteen representatives of the Association Corporate members attended a seminar on fiber identification at the Institute of Paper Chemistry.

Committees and Divisions

The past year continued the trend toward better organization and functioning of the Association's committees. This has been brought about by a practice of making as few changes as possible in personnel and by having the personnel of several committees located in limited regions, thereby enabling such committees to meet more frequently.

Following are comments concerning the personnel and some of the major activities of the divisions and committees.

Enginering Division, W. G. MacNaughton, News Print Service Bureau, general chairman. The only personnel change in this division was in the Heat and Power Committee in which Roderick O'Donoghue, consulting engineer, replaced A. W. Montgomery as chairman. J. A. Lee, Chemical and Metallurgical Engineering and L. B. Miller of Keasbey & Mattison Company, continued as chairmen of the Materials of Construction and Water Committees respectively.

The Water Committee completed its work of preparing a monograph on "Process Water" which will be published in 1941. The Materials of Construction Committee established two new subcommittees, namely on Packing Materials with J. W. Hemphill of the Johns Manville Company, chairman, and on Piping and Tubing with S. B. Jones of the West Virginia Pulp and Paper Company as chairman.

The Technical Association became a member of the American Coordinating Committee on Corrosion, being represented by J. A. Lee.

In the Heat and Power Committee, the Power and Lighting Requirements Subcommittee was discontinued. A. W. Montgomery of the J. O. Ross Engineering Company succeeded L. G. Green of the A. P. W. Paper Company as chairman of the Drying, Heating and Ventilating Subcommittee. J. W. Ogden of the Foster-Wheeler Company replaced P. W. Foster of the same company as chairman of the Heat Utilization Chemical Processes Subcommittee. E. F. Burns of the International Paper Company succeeded Grover Keeth of the Marathon Paper Mills as chairman of the Production and Transmission of Power Subcommittee.

Industrial Division: H. P. Cannon, of the Mutual Boxboard Company, general chairman, was succeeded by H. H. Hanson of W. C. Hamilton and Sons. Mr. Hanson was succeeded by E. N. Poor of the same Company as chairman of the Nonfibrous Raw Materials Committee. John Traquair of the Mead Corporation and L. T. Stevenson continued as chairmen of the Fibrous Raw Materials Committee and Industrial Engineering Committee respectively. The Waste Committee was discontinued.

Converting and Consuming Division: A. W. Nickerson, consulting engineer, general chairman. J. F. Halladay of the Downingtown Manufacturing Company was succeeded by M. S. Kantrowitz of the Government Printing Office as chairman of the Graphic Arts Committee. F. W. Egan of John Waldron and Sons and J. D. Malcolmson of the Robert Gair Company continued as chairman of the Coating and Container Committees respectively.

Research Development Division: The association unfortunately lost through death one of its strongest supporters, C. E. Curran of the Forest Products Laboratory, who has been chairman of this division for the past few years. Upon Dr. Curran's passing, D. W. McCready took over his work as acting general chairman.

The other chairmen in this division are C. J. West, Institute of Paper Chemistry, Abstracts and Bibliography Committee; C. W. Revise, Caesar & Revise, Patents Committee; and H. F. Lewis, Institute of Paper Chemistry, Fundamental Research Committee. Allen Abrams, Marathon Paper Mills, was appointed chairman of the newly formed Bacterial Control Methods Committee.

The History and Biography Committee was discontinued.

Pulp Manufacture Division: S. D. Wells of the Institute of Paper Chemistry succeeded V. P. Edwards of the International Paper Company as general chairman. D. T. Jackson of the Hammermill Paper Company succeeded Charles Carpenter, Southlands Paper Company, as chairman of the Pulp Purification Committee. The other chairmen are Lyman Beeman, St. Regis Paper Company, Mechanical Pulping Committee; H. A. DuBois, Kimberly-Clark Corporation, Acid Pulping Committee; and Paul Hodges, Florida Pulp and Paper Company, Alkaline Pulping Committee.

Paper Manufacture Division: G. Lamont Bidwell, Riegel Paper Corporation, general chairman. The other chairmen are C. M. Connor, Valley Forge Laboratories, Preparation of Nonfibrous Materials; W. D. Harrison, Ecusta Paper Company, Stuff Preparation Committee; and A. E. Bachmann, Mississquoi Corporation, Forming and Finishing Committee.

Testing Division: J. d'A. Clark, Institute of Paper Chemistry, general chairman. W. O. Hisey, New York State College of Forestry, succeeded F. W. Brainerd, Scott Paper Company as chairman of the Pulp Testing Committee. Two new committees were formed, namely the Microscopical Analysis Committee and the Chemical Methods Coordinating Committee. F. W. Bentzen, Kimberly-Clark Corporation and B. L. Browning, Institute of Paper Chemistry, were appointed respectively chairmen of these committees. N. M. Davis, Kimberly-Clark Corporation, succeeded J. L. Parsons, Hammermill Paper Company, as chairman of the Optical Properties Committee. The Optical Properties Committee represented the Association as delegates to the Inter-Society Color Council. The other chairmen are C. E. Hrubesky, Forest Products Laboratory, Fibrous Materials Testing Committee; W. A. Kirkpatrick, Allied Paper Mills, Nonfibrous Materials Testing Committee; and B. W. Scribner, National Bureau of Standards, Paper Testing Committee.

The Water Vapor Permeability Subcommittee of the Paper Testing Committee was discontinued. P. F. Wehmer, Electrical Testing Laboratories, E. J. Albert and P. W. Codwise respectively, continued as chairmen of the Chemical Methods, Testing Instruments and Writing and Erasing Properties subcommittees. S. C. Fairbanks, Hamersly Paper Company,

was appointed chairman of the newly organized Absorptiveness to Paraffin Subcommittee.

Miscellaneous Committees: R. A. Hayward, Kalamazoo Vegetable Parchment Company, succeeded W. M. Shoemaker, National Vulcanized Fibre Company as chairman of the Finance Committee. E. W. Tinker, American Paper and Pulp Association succeeded C. W. Boyce, Kraft Paper Association, as chairman of the Certified Pulp Testers Bureau, Inc. R. C. Griffin, A. D. Little, Inc., J. L. Parsons, Hammermill Paper Company and George Carruthers continue as chairmen of the Standards Committee, the Research Appropriations Committee and the Joint Textbooks Committee, respectively. Grover Keeth, Marathon Paper Mills, continued as delegate to the A.S.M.E. Boiler Feedwater Subcommittee of the Boiler Code Committee on Care of Steam Boilers in Service. Lester Kirschbaum, Flintkote Company; J. A. Lee, Chemical & Metallurgical Engineering; J. D. Malcolmson, Robert Gair Company; R. G. Macdonald, TAPPI; H. C. Schwalbe, Mead Corporation; John Traquair, Mead Corporation; R. F. Wehmer, Electrical Testing Laboratories; and B. L. Wehmhoff, West Virginia Pulp and Paper Company represented the Association on A.S.T.M. Committees.

J. d'A. Clark To Be Research Associate

Westbrook Steele, executive director of the Institute of Paper Chemistry, has announced the appointment of James d'A. Clark as research associate as of February 17, 1941. Mr. Clark, who has been carrying on graduate work at the Institute for the past two years, completed the requirements for the Degree of Doctor of Philosophy on February 11, 1941, the subject of his thesis being "Measurement of the Specific Surface Area and Some Other Properties of Pulps;" the degree will be granted by Lawrence College at its annual commencement in June of this year.

It is scarcely necessary to introduce Mr. Clark to the paper fraternity, as he is well known for his work on pulp and paper and his many publications on this subject. Born in Scotland, his youth was spent in South Africa, where he studied at Rhodes University College and the University of Cape Town. He received the degree of B. Sc. in Engineering from University College, London, in 1922. In 1924 after attending Battersea Polytechnic, London, he passed the examination of the City and Guilds of London in the chemistry of papermaking and paper-mill engineering. After serving an apprenticeship with Masson and Scott, paper-mill engineers, and with Hendon Paper Works Company, Sunderland, England, he became assistant to the Chief Electrical Engineer of Edward Lloyd, Ltd., Sittengbourne, England, at the time their new Kemsley mill was being built and where the new 320-inch newsprint machine had just been installed.

J. D'A. Clark

In an open competition with over six hundred graduates of the University of London, he won the 1924-1925 Sir Robert Blair Fellowship in Applied Technology (which was established by the London County Council in 1924) and, as a result, spent fifteen months in Canada and the United States, studying the manufacture of pulp and paper; part of this time was spent at the Canada Paper Company, where he was in charge of their technical work; his report of this trip was printed by the Technical Section of the Paper Makers' Association of Great Britain and Ireland in 1927. From 1926 to 1930 he was Chief Chemist of Bowater's Paper Mills, Ltd., of Kent, England.

In 1930 he came to the United States and for two years was development engineer of the Mead Corporation, being associated with all the laboratory work and technical development of the Corporation. From 1932 until he entered the Institute as a graduate student he was with the Scott Paper Company, of Chester, Pa., three years as technical director and three and a half years as engineering and technical manager. He has to his credit several patents on the manufacture of boards, printing paper, and tissue products, and on the moisture testing of materials.

Mr. Clark has been very much interested in pulp and paper testing, to which he has applied his wide engineering background. While in England he served as secretary of the Pulp Evaluation Committee of the Paper Makers' Association, designed the sheet-making equipment which is now standard in Great Britain, Canada, and the United States and, with the assistance of others, wrote the standard method. He has also designed a kollergang (a precision laboratory beater to work in conjunction with the standard sheet machine), a laboratory refiner, a stretch tester, a moisture meter (for grain and granular material), the multiple folding endurance tester, a precision white water sampler and meter, a pulp classifier, and the Clark softness and stiffness tester.

His interest in testing is further evidenced by the fact that he is chairman of the Testing Division of TAPPI.

In addition to being a member of TAPPI (Chairman of the Delaware Valley Section in 1938 and 1939), Mr. Clark is also a member of the Technical Section of the Paper Makers' Association of Great Britain and Ireland, the Canadian Technical Section, and the Institution of Mechanical Engineers of London.

Modern Recovery Unit for the Sulphate Process*

By F. H. Rosencrants[1]

Abstract

Primary objectives of recovery unit in order of importance are: continuous reliable production; high reduction and recovery of chemical; and steam production.

The two important obstacles to continuous reliable production are slag and the excess water in liquor to furnace. The first difficulty is met by using vertical tubes spaced on wide centers arranged for gas flow parallel to tubes and providing adequate easily accessible lancing ports. The second obstacle is overcome by maintaining the solids in the liquor to the furnace consistently at the highest practical value. High temperature of liquor to furnace is essential to drying in suspension.

Process of chemical reduction is described and conditions essential to high reduction is outlined with particular reference to point and quality of air admission.

The character and approximate amount of chemical carried by gases is discussed and means of reducing it to a minimum; also the means of handling the solids deposited in the back passes in the boiler.

The problems of labor, maintenance, and control are briefly discussed.

A capacity of 200 tons[2] or more has become a popular size of recovery unit. Capacity limitations would have necessitated the discontinuance of the rotary drier and separate furnace type of unit which reached its ultimate development in the Murray-Waern design. The performance which has progressed with recent developments in high-capacity spray-type equipment is a further reason for the monopoly now established for this design.

Obstacles of Continuous Production

In the design of any piece of productive equipment the most important objective is that it shall produce. This is true even in the case of a machine or piece of equipment which is complete in itself and unassociated with other equipment in a cooperative effort. In the case of a recovery unit performing only one of a series of functions essential in the complete process, reliable continuity of production at a predetermined rate is of the utmost importance. Little satisfaction accrues to the management, however meritorious a unit may be in every other respect, if either accidental or frequent routine outages are associated with its operation. Next in order of importance is high chemical recovery and reduction—i.e., the recovery of as much of the soda salts as possible and the conversion of the sulphur into sodium sulphide (Na_2S). Finally, the unit should recover as much of the heat of combustion as is economically possible in the form of high pressure steam. Summarized, the primary objectives of the recovery unit in order of their importance are:

(1) continuous reliable production; (2) high reduction and recovery of chemical; and (3) steam production.

The two important obstacles to the attainment of continuous reliable production have their origin in the high percentage of low fusion temperature ash and in the high moisture content of the fuel at admission to the furnace. Fused ash plugs the gas passages. Excess moisture puts the fire out. Ash carried in the combustion gases in mechanical suspension and as sublimate vapor is a mixture of sodium carbonate (Na_2CO_3) sodium sulphate (Na_2SO_4), a small amount of sodium sulphide (Na_2S), some carbon, and a small amount of other impurities. The fusion temperature of the solid mixture is of the order of 1400 to 1500 deg. F. The sublimate vapor results in little operating difficulty but is objectionable to the extent of the loss of chemical involved. The solid constituent however is troublesome. Until cooled down to a temperature below 1300 deg. F. it has a strong tend-

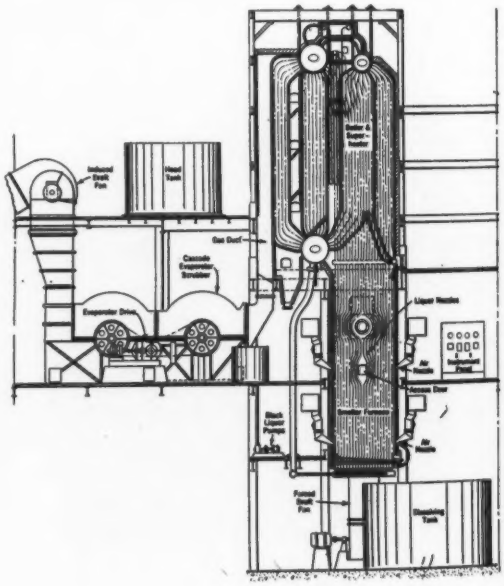


FIG. 1
Typical of the Design of the Several Units Now in Operation

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[2] The "ton" of capacity as used throughout this paper should be defined. The chemical recovery unit never remotely contacts the pulp. It deals entirely with the solids in the spent liquor separated from the pulp after discharge from the digesters. Depending on the kind of wood used, whether a raw cook for paperboard pulp, a long cook for high-bleach pulp, or an intermediate cook is being used and on other factors, the weight of solids will vary over the range of about 2300 to 3400 pounds per ton of pulp produced. As used in this paper, however, this value is fixed at 3000 pounds. A 200-ton unit therefore becomes a unit with a capacity of 600,000 pounds of dry solids per 24 hours (before the addition of salt cake). To translate this into capacity in terms of "tons of pulp" as applying to any specific plant requires only that the figure of 600,000 be divided by the pounds of solids in the liquor per ton of pulp as applying to that situation.

ency to stick to everything with which it comes in contact.

Slagging Problem

In practical design the gas temperature does not fall below 1300 deg. F. until it has passed over a considerable amount of boiler and superheater surface. In this zone slag adherence must be expected. It may, however, be reduced to a minimum and its character made least objectionable by using vertical tubes spaced on wide centers and arranged for a gas flow parallel thereto. These provisions result in a minimum contact of suspended solids with the tube surface, a weak porous slag structure, and absence of supporting surfaces on which solid particles can deposit and accumulate. Some sloping and perhaps even some horizontal tube sections may be unavoidable in a practical design, but considerable expense is justified in reducing the extent of such elements to the absolute minimum.

After the formation of slag has been minimized by proper design, provision should be made for hand lancing every square foot of surface through an adequate number of covered ports accessible from floors, spaced at convenient elevations.

The boiler or superheater surface (Fig. 1) with which the first thin layer of liquid or sticky slag particles come in contact is not over 800 deg. F., hence such particles are quickly cooled to a point well below the sticky condition and they become particles of dry dust having little adhesive strength to the tube and also little cohesive strength to the immediate subsequent layer. Each successive layer will cool more slowly than that preceding, due to the *accumulating insulating* influence, until finally they do not have sufficient time to cool below the sticky point before subsequent particles deposit. At this point the coating starts forming as a crust until ultimately a hard vitreous accumulation is the result. Gas flow parallel to the tubes in contrast with right-angle flow contributes to a slow rate of contact of the suspended particles and extends the period of cooling time between deposit of successive layers. This results in a thicker layer of dust and highly porous slag and makes removal of the deposit as a whole a less frequent, a much easier, and a more effective operation than would otherwise be the case (Fig. 2).

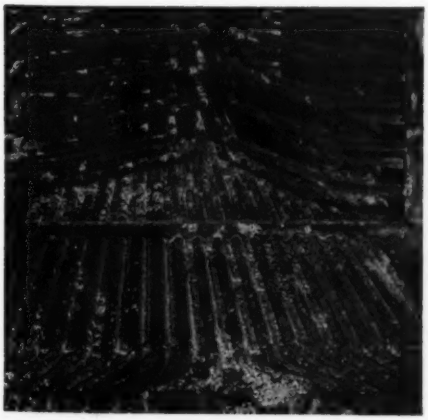

FIG. 2

Taken Straight up from the Bottom of the Furnace after 6 Months Continuous Operation. No Cleaning Was Done at This Shutdown Before Placing the Unit Back in Service.

FIG. 3

Furnace Wall Surface after 6 Months Continuous Service. Shows Character of Coating Perpetually Maintained

In the temperature zone above 1700 deg. F. slag forms on the heating surface in a relatively thin layer. The insulating value of the initial deposits retards the cooling influence of the tube beneath to the point where the heating influence of the gas maintains the surface at a temperature above the melting point causing the surface slag to run and drip. Above 1800 deg. F. this action results in a self-perpetuating layer of slag limited in thickness to about ⅛ to perhaps ⅜ of an inch thick. This action is particularly apparent on the bare furnace wall tubes shown in Fig. 3, taken after 6 months' continuous operation.

The advantage of spacing the tubes on wide centers as applying to both the boiler and the superheater will be obvious. It minimizes the obstructive influence to gas flow as a result of any given thickness of deposit and the possibility of the space becoming completely bridged across from tube to tube. It facilitates the lancing operation and provides greater clearance for the free fall of dislodged material.

The bulk of the material dislodged during lancing falls to some point below. Some of the finer particles will be picked up by the gas stream and carried along. A considerable advantage accrues if the arrangement provides for the falling material to drop directly into the furnace; otherwise provision must be made for its removal from hoppers and its return to the furnace by manhandling. Satisfactory mechanical means for performing this operation have not thus far become a practical achievement.

No great difficulty is experienced beyond the temperature zone of 1200 to 1300 deg. F. Steam soot blowers are effective and their maintenance is nominal. Vertical tubes are still desirable as they afford less support for deposited chemical. Effective means for mechanically handling the deposited material from hoppers in this zone is highly desirable and is a practical achievement.

Referring to Fig. 1 the tubes ahead of the superheater are spaced on 12-inch centers across the boiler and 10¼ inches from front to rear. The superheater tubes are on 6-inch centers across and 5⅛ inches front to rear. The small front upper drum is installed to avoid horizontal runs which would otherwise be necessary to connect the boiler tubes ahead of the superheater into the main steam drum. The lower sloping and horizontal elements of these tubes are unavoidable. Although in a zone of temperature which restricts the deposit of slag to a coating which

tends to run and drip into the furnace it is this section which requires the maximum lancing. The upper return loops of the superheater extend above the baffle which lays on the circulator tubes between drums. The horizontal tops of these loops are eliminated as supporting surfaces for slag deposits. The whole of the superheater and the boiler tubes ahead of it overhang the furnace so that all slag which becomes dislodged by the force of gravity or by lancing falls directly into it. The superheater tubes, spaced on 5⅛-inch centers, register with the spacing of the furnace end wall-fin tubes, thus lancing ports give ready access to the spaces between. The front furnace wall-fin tubes are spaced on 5⅛-inch centers, and ports in this wall provide for lancing back to the baffle at the rear of the superheater. It is therefore obvious that the lanes in both directions between superheater and boiler tubes may be readily lanced. Floors at frequent elevations are provided, giving convenient access to all lancing ports. Fins are omitted from the furnace wall tubes at each lancing port. The doors are 2½ inches in diameter and the port through the fins is 2⅛ inches square.

The baffle immediately behind the superheater is constructed by putting fins on the boiler tubes and sealing the space between fins with short sections of 1-inch **T**-bars welded to the fins (Fig. 4). This baffle will stand any abuse to which it may be subjected during lancing operations.

Temperatures throughout the vertical pass of boiler and superheater surface, as established by thermocouple measurements, at full-load capacity are shown in Fig. 5. These temperatures were taken after several months of continuous operation. It will be observed that the temperature of the gas at outlet from the superheater where it goes over the first baffle is about 1200 deg. F. or below the fusion point of the entrained particles.

Spacing of tubes in the boiler passes beyond the superheater conforms to normal boiler practice. Material which deposits on this surface is in the form of a dry dust readily removed by mechanical soot blowers. Deposited material in the hopper below the rear passes is continuously removed and returned to the system via the cascade evaporator. A pump circulates and sprays a solution of weak liquor or water and ash

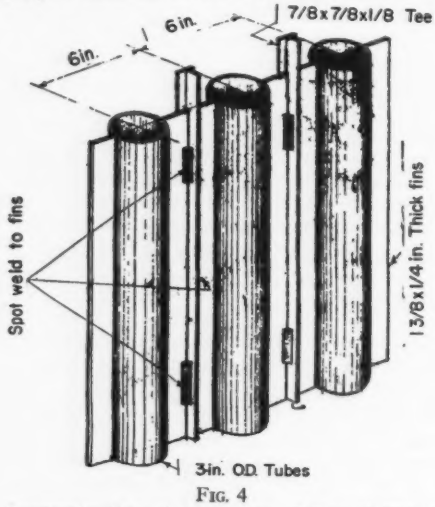

FIG. 4

Baffle Construction Back of Superheater. T-Bars of High Temperature Resisting Metal Cut in Short Sections and Seamed by Spot Welding

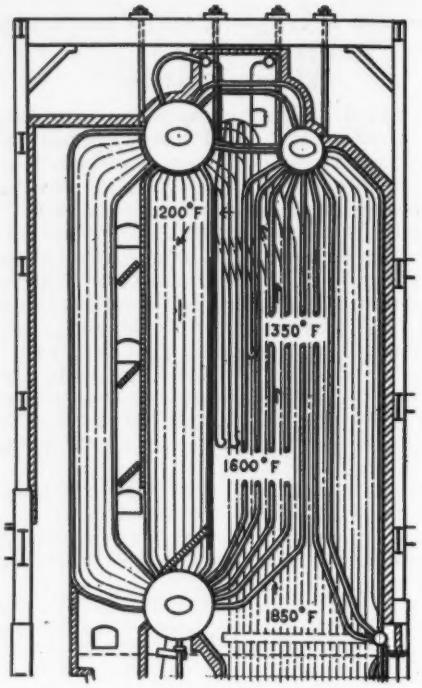

FIG. 5

Thermocouple Temperature Survey at Full Capacity After Several Months Continuous Operation

into the hoppers which sweep out the ash deposit and delivers it to the ash dissolving tank (Fig. 6). The mixture is delivered in slurry form to the cascade evaporator. All manhandling and consequent dust nuisance is entirely avoided.

Moisture Problem

The liquor feed to the furnace is a mixture of inert

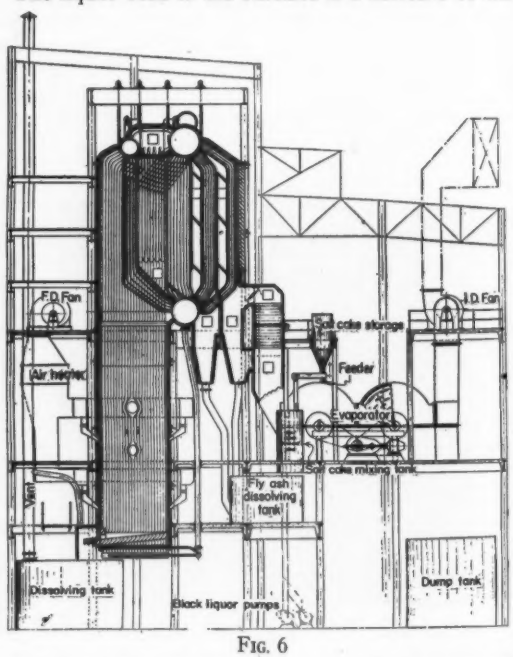

FIG. 6

Unit Designed for the Ultimate in Steam Production—See Text under "Steam Production"

chemicals, organic solid matter, and water. The organic matter from which all of the heat of the liquor is derived makes up from 50 to 60% of the total solids. The corresponding heat value will run from about 6000 to 7200 B.t.u. per pound. To maintain fixed furnace conditions the ratio of the heat available to the corresponding weight of water should be about constant—e.g., a liquor having 60% solids with a heat value of 7200 B.t.u. per pound will have a ratio of B.t.u. to water of 0.60 times 7200 divided by 1 minus 0.60 = 10,800; to give the same furnace conditions with a liquor having 6000 B.t.u. per pound solids the percentage solids would have to be 64.3%. Thus 0.643 times 6000 divided by 1 minus 0.643 = 10,800.

The ratio of organic matter to inert chemical in the liquor is influenced by the character of product being produced, by the kind of wood used, and to some extent by the routine established in the specific mill. A paperboard mill using pine wood produces a liquor high in organic matter. A mill producing high-bleach pulp produces a liquor low in organic matter. The heat value will vary accordingly. Jack pine produces a higher heat-value liquor than chestnut or gum.

A mill producing a single quality of pulp from only one kind of wood can stabilize operation to give a consistent performance throughout, including the recovery unit. A mill producing a variety of products from a number of different kinds of wood under the most skilled operation will deliver liquor to the recovery unit varying in heat value over a considerable range. To obtain satisfactory performance of the recovery unit, the foreman must have an appreciation, born of experience, of the influence of these factors and compensate for them in operation. In the absence of a substantial margin of operating flexibility in the unit itself and the cooperation of the pulp mill superintendent, he will experience difficulty in avoiding erratic performance.

The importance of moisture control in the liquor to the furnace is too obvious to merit extensive comment. Consistent, stable operation demands that it be held within narrow limits. At some upper limit it puts the fire out. With a high heat value of solids this point might be 50% with a low value, 40%. The lower the moisture content the better. Furnace conditions steadily improve with increase in the solid content. Carryover of solids with the products of combustion is reduced, and it is believed that there is also some improvement in chemical reduction. Steam production improves almost pound for pound with the reduction of the amount of water sprayed into the furnace.

The present stage of development in liquor pumps places a limit on the liquor solids at about 70%. Some improvement may be expected by further development, but the limit of other elements of the assembled equipment is not far away.

With a constant value of water content in the liquor to the cascade evaporator, and a reasonably constant heat value of the solids, control of moisture content in the liquor to the furnace presents no difficulty. In some mills the moisture is not held at any fixed value. In some few instances the degree of variation has been small. In others it has been almost prohibitive. In the majority of cases it is enough to be a factor in the satisfactory performance of the recovery equipment.

Liquor should be delivered to the furnace with the minimum water content—i.e., with the limit of solid content which the liquor pumps will handle—about 70%. Actual operation may, with good design and reasonable supervision, be maintained within 5% of this value or at a minimum of 65%. Natural circulation multieffect evaporating equipment can be operated to deliver liquor with 55% solids, perhaps a little more. They are being operated in modern mills over a range of 45 to 55%. In some instances the whole range is covered in the one mill. The difference between the amount of water delivered by the multieffect evaporating plant and the amount delivered to the furnace is the evaporative function of the cascade evaporator. This unit derives its evaporating capacity entirely from the hot gases delivered to it from the boiler. The weight of these gases per pound of solids is fixed within narrow limits. The water-removing capacity of the cascade evaporator therefore becomes almost exactly proportional to the drop in temperature of gases between its inlet and outlet. The outlet temperature varies over a comparatively narrow range with a wide range at the inlet. With only a small inaccuracy it may therefore be said that the water-removing capacity of the cascade evaporator is a function of the inlet gas temperature.

The precise gas temperature required at the inlet to the cascade evaporator is subject to calculation and it may be approximated by skillful design. Flexibility demands that some excess margin of temperature be provided at this point, 100 deg. F. is desirable. It is just as essential to the practical operation of the recovery unit as is the excess engine power to the practical operation of an automobile. The excess of evaporative capacity due to the margin of temperature is counteracted by admission of weak liquor. By this means control of solids from the cascade is secured.

Liquor to the salt cake mixing tank from the cascade evaporator is at a temperature of 180 to 190 deg. F. This temperature is influenced little by temperature of inlet and outlet gas or by the inlet liquor temperature. This is a phenomena, the scientific explanation of which is somewhat involved and unimportant to this discussion. To obtain the maximum fluidity and promote flow to the suction of the liquor pump the liquor is heated in the pipe between the outlet of the mixing tank and the pump suction. The heating is accomplished by direct contact steam to a little over 200 deg. F. A second heater raises the temperature to some established desirable temperature on the discharge side of the pump. Between 0.03 and 0.05 pound of low pressure steam per pound of solids in the liquor is consumed in this process.

Liquor is delivered to the furnace through two nozzles at each end directed along the axis parallel to the side walls. To obtain an even distribution over the whole cross section of the furnace the nozzles are preferably given a slow rocking motion in a vertical plane. Owing to the elevated temperature of the liquor above the boiling point at atmospheric pressure a part of the contained moisture flashes into steam at release from the nozzle and expands each particle of liquor to several times its normal diameter. The surface of a liquor particle increases with the square of its diameter, hence a particle expanded to 3 times its normal diameter exposes 9 times the normal surface. It is to this process of increasing the exposed surface that the drying operation in suspension owes its success.

The extent to which the moisture is removed be-

fore the sprayed particles land on the hearth below is not known. Since the particles are not of uniform size it is unlikely that the drying is uniform. The temperature, to which the liquor is elevated before spraying, is an important factor in the drying process. It is limited to the minimum required to establish stable furnace conditions. Excess temperature causes unnecessary expansion of suspended particles and tends to aggravate entrainment in the gas stream.

Reduction

Sodium sulphide (Na_2S) is a combustible material. In the combustion process it takes on oxygen to form sodium sulphate (Na_2SO_4) just as carbon (C) takes on oxygen to form carbon monoxide (CO) or carbon dioxide (CO_2). If, however, sodium sulphide, carbon, and a limited amount of oxygen are intimately mixed and subjected to sufficient temperature, the carbon will claim its full requirement before any oxygen is available for the sodium sulphide. The stronger affinity of the carbon for oxygen is such that if sodium sulphate (Na_2SO_4) is intimately mixed with carbon and the mixture raised to the required temperature the carbon will rob the sulphate of its oxygen and reduce it to sulphide. This condition is deliberately created in the bottom of the smelter furnace. Only a limited amount of air is admitted at this point, enough to augment the oxygen supplied by the sodium sulphate present to the point required to transform all the carbon to carbon monoxide and partially to carbon dioxide but so restricted as to be sure of no excess which would permit retention of oxygen by the sodium sulphate. Correctly designed equipment, skillfully operated, is capable of reducing as much as 98% of the sulphur supplied to the furnace as a sulphate to sulphide. Normally 92 to 96% reduction is obtained.

Recovery

A supply of secondary air, sufficient for developing the maximum heat in the drying zone, is admitted at a point below the spray nozzles. To insure complete combustion and a maximum consequent steam production, a tertiary air supply in an amount exceeding the theoretical requirements for combustion is admitted at high velocity at a point well above the sprays. Admitted at this point it insures completeness of combustion but does not aggravate the entrainment of solids in the gas stream.

A belt of air ports near the furnace bottom provides the restricted air supply essential to the reduction process (Fig. 1). A second row of ports at an elevated position but below the sprays supplies the air for promoting the high temperature zone required for drying. Tertiary air is supplied through high-powered jets at the furnace ends, jets which may be combined with auxiliary oil burners if the possibility of operating the boiler on oil under emergency mill conditions is desired. This air gives a vigorous lateral stirring of the fuel-air mixture and completes the combustion process with the minimum excess. Being admitted above the sprays it contributes little to the entrainment of suspended chemical.

Stack loss of chemical with all types of furnaces is a substantial amount. As previously stated the character of this loss takes two forms, mechanically suspended solids and sublimate vapor. Both originate in the furnace. The solids are picked up by the rapidly moving gases. The sublimate is caused by temperature and is independent of gas velocity. The suspended solids can be and are effectively recovered by mechanical and scrubbing means. The sublimate passes through all such devices to the stack and constitutes the major item of loss, at least 100 pounds per ton of pulp. Electric precipitation has proved effective in its recovery.

In Figs. 1 and 6 a minor part of the suspended material is collected in the rear hoppers of the boiler and returned to the system via the fly-ash dissolving tank. The remainder is removed with a close approach to 100% efficiency in the cascade evaporator. The inorganic solids caught are reflected in a 3 to 4% lowering of the heat value of solids in liquor samples taken at evaporator outlet.

Steam Production

Steam, the byproduct of the chemical recovery process, is an important item in the economic balance. It should be remembered, however, that it is a byproduct and not the main issue. Many of the heat losses are inherent in the process and beyond the control of either the designer or the operator of the recovery equipment. The importance of providing the conditions for complete combustion with minimum excess air will be conceded without argument.

Units now operating have demonstrated the possibility of oversizing the furnace. All units in service are operating at capacities considerably in excess of anticipated rates and perform better than at the rates for which they were designed. Fortunately, the mills in all cases have been able to use the excess capacity to advantage.

The boiler shown in Fig. 1 is provided with 3-inch tubes throughout. The outlet gas temperature to the cascade from this unit is about 700 deg. F. and permits a corresponding solid content in liquor to the cascade down to 42 to 45%. The unit shown in Fig. 6 provides an additional pass of boiler tubes, space being acquired by using larger drums and substituting 2-inch tubes for 3-inch tubes in the last two passes. Additional heating surface is provided in an economizer. The gas temperature to the cascade evaporator may be powered to below 450 deg. F. and will require that the liquor be delivered to the cascade with a solid content of approximately 55%. A compromise unit may be built using the 2-inch tube boiler arrangement of Fig. 6 but omitting the economizer. In this case the outlet temperature to the cascade will be about 600 deg. F. and the required solids in the liquor will be about 47 to 50%. In each of the above instances a margin of gas temperature of 100 deg. F. to the cascade is assumed for the purpose of providing flexibility in operation. Under normal conditions a small flow of weak liquor to the cascade to prevent excessive thickening will be required. The corresponding outlet gas temperatures from the cascade for the 3 units mentioned will be about 290, 230, and 260 deg. F., respectively.

The cost of both the recovery unit and the multi-effect evaporating equipment will increase with each decrease in gas temperature to the cascade equipment. The cleaning labor incidental to the economizer might conceivably push the lancing and cleaning job beyond the capacity of the one man otherwise required.

A steam heated air heater is used to heat all air to the furnace. Steam at digester pressure (125 to 150 pounds per square inch is used. Particular attention is directed to the fact that this constitutes no loss of heat since the entire heat content of the steam used is

TABLE I.—TYPICAL HEAT BALANCE

Pressures and Temperature Conditions			
Design pressure, pounds			475
Safety valve setting, pounds			470
Steam pressure (S. H. O.), pounds			450
Total steam temperature, deg. F.			700
Feedwater temperature, deg. F.			320
Air temperature to furnace, deg. F.			300
Liquor temperature to unit, deg. F.			190
Liquor Solids			
Approximate analysis, %			
Carbon			39.5
Hydrogen			3.5
Oxygen plus nitrogen			11.5
Sulphur			3.5
Ash			42.0
Heat value, B.t.u./lb.			7000
Design Data			
Dry solids per ton of pulp (before salt cake addition), lb.			3000
Excess air at cascade evaporator outlet, %			30
Salt cake added per ton, lb.			200
Heat datum base, deg. F.			32
Gas temperature to cascade evaporator, deg. F.	450	600	700
Gas temperature out of cascade evaporator, deg. F.	230	260	290
Solids in liquor to cascade evaporator, %	54.2	46.7	43.1
Temperature of liquor from cascade evaporator, deg. F.	180	185	190
Heat Input, M-B.t.u.			
1 Heat in dry solids	21000	21000	21000
2 Sensible heat in liquor	590	730	810
3 Heat in steam to liquor heater	174	157	140
4 Heat in steam to air heater	864	864	864
5 Heat in air to steam heater	210	210	210
6 Total input	22838	22961	23024
Heat Distribution, M-B.t.u.			
7 Dry gas loss	1050	1206	1361
8 Water vapor loss	4230	5290	5940
9 Reduction of added salt cake	600	600	600
10 Reduction of salt cake formed from sulphur	1400	1400	1400
11 Heat of fusion and sensible heat in smelt	1420	1420	1420
12 Heat in condensate from air heater	342	342	342
13 Heat loss in soot blowing (1.0%)	228	229	230
14 Radiation and unaccounted for (2.0%)	457	459	460
15 Heat in blowdown (0.5%)	114	115	115
16 Net heat available for steam	12997	11900	11156
17 Total distribution	22838	22961	23024
Steam Production, Lb.			
18 Per ton pulp	12100	11100	10400
19 Per ton of pulp from and at 212 deg. F.	13400	12280	11500
20 Per lb. dry solids from and at 212 deg. F.	4.47	4.09	3.83

returned to the boiler via the heated air and the condensate which goes back into the feed water. As a matter of fact a credit accrues from the use of this steam owing to the kilowatt hours generated by it at nearly 100% thermal efficiency in dropping from

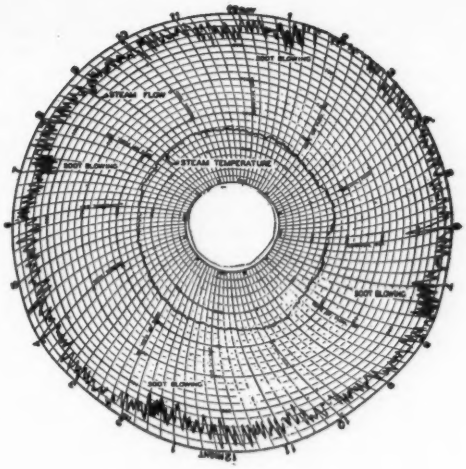

FIG. 7

Steam Flow and Steam Temperature for a 24-Hour Period after Several Months of Continuous Operation. Note Soot Blowing Period

boiler outlet conditions through the high pressure end of the turbine down to digester pressure. Typical heat balances, one for each of the units mentioned, give an idea of the relative steam producing capacity per ton of pulp—i.e., per 3000 pounds of dry solids—and are given in Table I.

Thus far all units built are similar to the Fig. 1 design. Steam productions consistent with heat balance figures are being attained. The chart, Fig. 7, is typical. This shows steam production and steam temperature for 24-hour period at the Chesapeake Corporation mill, West Point, Va. Figure 8 shows the steam production record from the beginning of operation up to November 30. Attention is directed to the continuity.

Control

Liquor fed to the furnace is held constant by hand setting of the variable speed drive on the liquor pump or by maintaining the pressure at the spray nozzles at

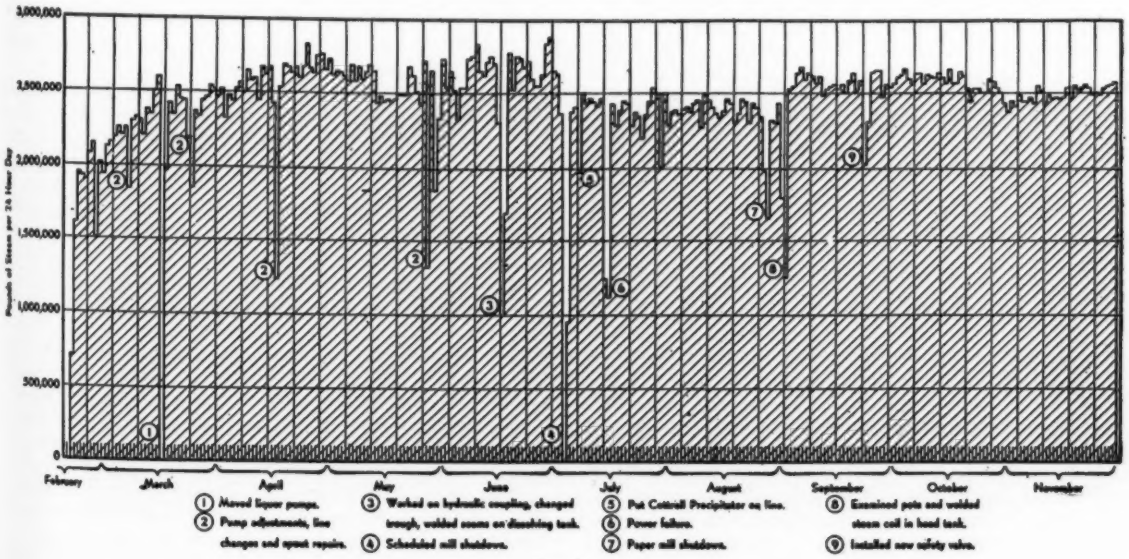

FIG. 8

Steam Production Record from Beginning of Operation to November 30, Chesapeake Corporation, West Point, Va.

a fixed point through manipulation of a bypass valve, permitting liquor return to the suction of a constant-speed liquor pump. A variable speed drive is definitely preferred.

Liquor feed to the cascade is automatically controlled to maintain the level within about a ¾-inch range. With a constant level in the cascade evaporator a recording ammeter on the driving motor serves as a recording viscometer and an operating guide for controlling the small flow of weak liquor required to maintain the thickness at the desired point. This operation may be made automatic.

Steam to the liquor heaters before and after the liquor pump is thermostatically controlled to maintain constant liquor temperatures.

Air flow to the furnace is determined by a recording differential draft gage which records the drop in air pressure across the steam air heater. For each rate of steam flow a corresponding rate of air flow is established for the guidance of the operator. The flow of air is controlled either by a damper or by variable speed drive on the forced-draft fan.

The induced draft is controlled by damper or preferably by variable speed drive of the induced-draft fan to maintain a constant negative pressure at the top of the furnace. This may be done by hand control but should be automatic.

The distribution of air between primary, secondary, and tertiary openings is established by dampers which are finally left in fixed position, the total air supply being controlled either by a master damper or by variable speed of the forced-draft fan.

Operating Labor

A review of labor requirements as applying to units now operating revealed that a conservative crew consists of 5 men distributed as follows:

Spray nozzle level attending furnace and cascade evaporator, 2 men;
Cleaner and water tender, 1 man.
Attending dissolving tanks, burner air ports, liquor pumps, etc., 1 man.
Free lance for service wherever needed, 1 man.

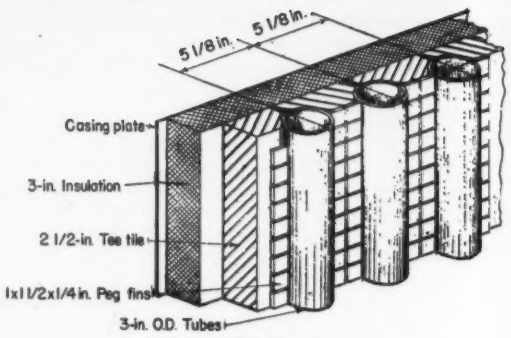

FIG. 9
Furnace Wall Construction

A second unit would require 2 or 3 additional men.

Maintenance

It is too early in the history of operation of units built with completely bare metal-walled furnaces to have accumulated maintenance figures. It seems certain, however, that this will be only a few cents per ton of pulp produced. The only exposure of refractory material is on the furnace bottom and indications up to date are that the wastage of this material will be nil. The wall construction is indicated in Fig. 9. After nearly 3 years of service on the original unit, walls of this design show no deterioration. Maintenance and depreciation on the cascade evaporator is practically zero. The gases passing through this unit are slightly acid. The liquor however is highly alkaline and all surfaces are at all times thoroughly protected by a coating of this liquor. Some corrosion of duct work and fans beyond the evaporator will be experienced and will, no doubt, require their renewal after a period of years. Auxiliary equipment such as valves, pumps, etc., will require the normal small amount of maintenance associated with this character of equipment in boiler plant practice.

Interpretation of Flue-Gas Analysis*

By Philip W. Swain[1]

Abstract

In nontechnical language, this article clarifies the meaning of flue-gas analysis and presents quick methods of determining theoretical air, percentage of excess air, etc. Theoretical air per pound of fuel equals heat value of the fuel divided by 1310 for anthracite coal, by 1350 for bituminous coal, lignite and wood, by 1720 for fuel oil. For a fuel containing no combustible other than pure carbon, the percentage of excess air is 100 times percentage of oxygen in flue gas divided by percentage of CO_2 in flue gas. Actual air is theoretical air plus excess. Actual flue-gas weight is actual air plus one pound.

This paper will not present any new combustion facts or theory. In nontechnical language, it will explain the meaning of a flue-gas analysis and show the quickest and easiest methods of computing the theoretical weight of air required to burn one pound of fuel, the percentage of excess air, the actual weight of air and flue gas.

All confusing technicalities will be avoided, with the thought that this paper may be passed along to firemen and others without technical training, who might profit from a better understanding of matters vitally affecting the yearly expenditure of millions of fuel dollars in the paper industry alone.

The discussion will be confined to solid fuels (carbon, coal, lignite, wood) and fuel oil.

The Groundwork

The two important combustible elements in commercial steam fuels are carbon and hydrogen. Sulphur, of minor interest as a heat source, will not be considered. Whether burned in their elementary forms, or in the form of hydrocarbon compounds, hydrogen and carbon produce the same combustion products. The hydrogen always burns to water (H_2O). The carbon normally burns to carbon dioxide (CO_2), although some of it may burn incom-

*Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Roosevelt Hotel, New York, N. Y., Feb. 17-20, 1941.
[1] Editor of Power, McGraw-Hill Publishing Co., New York, N. Y.

pletely to carbon monoxide (CO) under certain conditions. For simplicity, this study will assume that all the carbon in the fuel is completely burned to CO_2.

In addition to these two products of actual combustion (H_2O and CO_2), the furnace flue gas must contain all the nitrogen in the air supplied plus all the oxygen not used up in burning the carbon and hydrogen.

Air "Burns"

When hydrogen or carbon combines with oxygen we ordinarily say that the carbon or hydrogen "burns" and the oxygen "supports" the combustion. This purely arbitrary assumption is often convenient because the atmosphere provides an unlimited supply of oxygen, whereas we must pay good money for carbon and hydrogen in the form of commercial fuels. Chemically, we could say with equal justification that the oxygen "burns" and that its combustion is "supported" by carbon or hydrogen.

In certain types of problems this latter concept helps one to a clear understanding and permits convenient short cuts in computation.

"Heat Value" of Oxygen and Air

If we consider oxygen as a combustible it must have a "heat value" expressible in British thermal units per pound and the same must be true of air because of its fixed oxygen content. This value varies slightly according to the element with which the air burns. Burned with pure carbon, the heat value of air is 1270 B.t.u. per pound; with pure hydrogen it is 1800 B.t.u. per pound.

In all the commercial solid and liquid fuels the combustible portion consists mainly of carbon and hydrogen, with the carbon dominating by a wide margin. Thus the heat value of air burned with commercial fuels must lie between 1270 and 1800, but always closer to 1270. The higher the relative hydrogen content of the fuel (not counting any hydrogen already combined with oxygen), the higher must be the heat value of the air burned with it. The variations of that heat value within a given general class of fuels is slight. Thus, for all practical purposes, the heat value of air may be taken as 1310 for anthracite coal, 1350 for all other coals (including lignite) and for wood, 1370 for all fuel oils. None of these values will give an error greater than 1 or 2%.

To determine the theoretical air required to burn one pound of any fuel it is merely necessary to divide the heat value of one pound of the fuel by the heat value of one pound of air for the given fuel. Thus, if a certain wood waste has a heat value of 5500 B.t.u. as fired, its theoretical air requirement is $5500 \div 1350 = 4.07$ pounds of air per pound of fuel.

If this wood is burned with 50% excess air, the actual air supplied per pound of wood burned will be $4.07 \times 1.5 = 6.1$ pounds. To figure the total fuel gas produced per pound of wood, assume that all the wood goes up the stack with the air. Then the weight of flue gas will be $6.1 + 1 = 7.1$ pounds. Note the simplicity of this method. Note also that the error is negligible, for all practical purposes.

Meaning of Gas Analysis

The concept of "burning air" is equally helpful in gaining an understanding of the significance of the flue-gas analysis, particularly when burning coals low in hydrogen.

We shall deal here with gas *volumes*, because both the air analysis and the flue-gas analysis are normally reported on a volumetric basis. To make the air and flue-gas volumes strictly comparable we shall assume that the flue gas is cooled to the temperature of the original air before the volume of its constituents is measured.

With these assumptions, note that the nitrogen in the air goes through unchanged in volume, along with any part of the oxygen that does not "burn." The part of the oxygen that does burn with carbon produces exactly the same volume of carbon dioxide. Any oxygen that burns with hydrogen produces a greater volume of water vapor, but this condenses to liquid water before analysis. This means that any oxygen that burns with hydrogen simply vanishes as far as the analysis is concerned.

Combustion of Carbon

In Fig. 1 the left column of "poker chips" represents the air, the right column the flue gas produced by the burning of this air. Each chip stands for 1 cu. ft. Thus the air has 79 cu. ft. of nitrogen and 21 of oxygen. Imagine this air burned (without any excess) with pure carbon. Then each black chip of oxygen changes into a "red" chip of carbon dioxide. Thus the resulting flue gas contains 21 cu. ft. of carbon dioxide and 79 cu. ft. of nitrogen. Since these add to 100 cu. ft., the percentages are 21 and 79 respectively.

This same picture will apply if the fuel contains, in addition to carbon, such inert elements as water and ash, as long as no hydrogen is present. Low-hydrogen fuels, such as anthracite coal, approximate this condition.

Figure 2 shows what happens when pure carbon burns with 50% excess air. Fourteen black chips (oxygen) change to red (carbon dioxide) and the other 7 (50%) remain unchanged. The flue gas contains 14% carbon dioxide, 7% oxygen and 79% nitrogen.

Figure 3 shows the case of 100% excess air. The flue gas contains 10.5% oxygen and an equal volume of carbon dioxide.

From these figures it will be clear that if the fuel contains no other combustible than carbon, the percentage of oxygen in the flue gas will always be 21 minus the percentage of carbon dioxide, and that the percentage of excess air will always be 100 times the percentage of oxygen divided by the percentage of carbon dioxide.

Commercial Fuels

All coals, wood, and fuel oil contain some available hydrogen, which complicates the situation somewhat because, as already noted, any oxygen that combines with hydrogen represents a vanishing volume. Anthracite coal, with the least hydrogen, comes closest to pure carbon. Bituminous coal and fuel oil show increasing deviations in that order.

Flue-Gas Analysis with Fuel Oil

With an average fuel oil the hydrogen present will burn about 1 volume of oxygen for each 2 volumes burned by carbon. To put it another way, the hydrogen will consume about 1 volume out of every 3

of oxygen actually "burned," while the carbon takes the other 2.

Let's assume a case (Fig. 4) where (out of each 100 cu. ft. of air) 15 cu. ft. of oxygen are burned and 6 cu. ft. are excess. Then the true excess air is $100 \times 6 \div 15 = 40\%$. In this case one might expect that the flue gas would show 6% oxygen. Actually the percentage of oxygen in the flue gas will be somewhat greater than 6%, because the burning of some of the oxygen with hydrogen shrinks the total volume below 100 cu. ft.

Of the 15 cu. ft. of oxygen burned, 5 cu. ft. (one third) will combine with hydrogen and vanish from the analysis, while the remaining 10 cu. ft. will produce 10 cu. ft. of carbon dioxide. Then the cubic feet and percentage of flue-gas constituents will be as follows:

	Cu. ft.	%
Carbon dioxide	10.0	10.5
Oxygen	6.0	6.3
Nitrogen	79.0	83.2
Total	95.0	100.0

Clearly, the rule given for pure carbon will not work here; $100 \times 6.3 \div 10.5$ is *not* 40% which has been shown to be the correct percentage of excess air in this case.

For fuels containing hydrogen as well as carbon, the curves of Fig. 5 will give the percentage of excess air for any percentage of carbon dioxide. Note that the curve marked "bituminous" can also be used, with reasonable accuracy, for lignite and wood. Thus if the flue gas from a wood fire contains 10.7% of carbon dioxide, the percentage of excess air is 71.

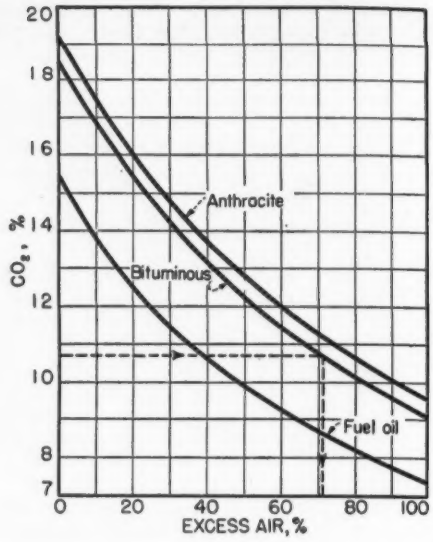

FIG. 5

Percentages of Excess Air for Various Percentages of Carbon Dioxide ("Bituminous" Curve Can Be Used, also, for Lignite and Wood).

The theoretical air needed to burn one pound of this wood can be figured by dividing the heat value by 1350 B.t.u. To this theoretical air add 71% to get the actual air.

To this add one pound to get the actual weight of flue gas (including moisture).

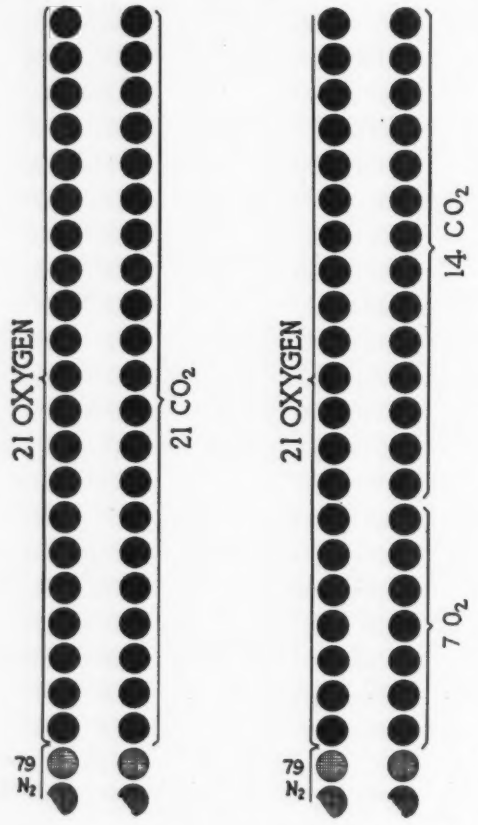

FIG. 1

FIG. 2

FIGS. 1—Air Burning with Pure Carbon. Left Column Represents Air, Right Flue Gas. FIG. 2—Pure Carbon Burning with 50% Excess Air.

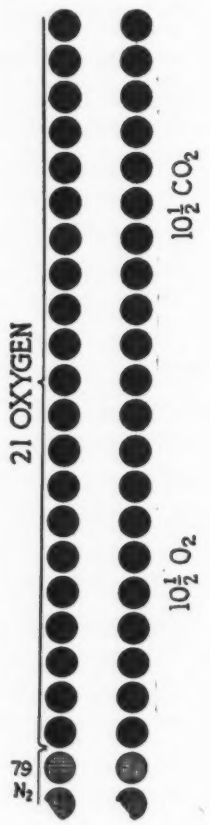

FIG. 3

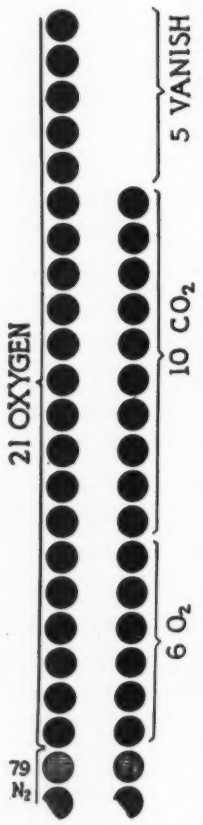

FIG. 4

FIG. 3—Pure Carbon Burning with 100% Excess Air. FIG. 4—Fuel Oil Burning with 40% Excess Air.

Volume, Sales, and Costs Relationship*

By Benton R. Cancell [1]

Abstract

Costs per ton of paper or pulp produced by a mill vary in more or less direct mathematical ratios to the total volume of production. Since these unit costs follow a decreasing trend as the total output is increased, management is prone to decrease prices substantially to acquire additional business and volume. Unless such price decreases are based upon actual savings in costs, additional volume may result in a decrease in total net profits. The paper presents, using hypothetical cost and price schedules, a graphic method of analyzing a company's operations to determine the optimum price and volume levels for a company.

The development of profits is fundamentally dependent upon good business judgment. But judgment to be good cannot be based upon either hopeful guesses or wishful thinking. In the final analysis it must be founded upon a whole series of logically arranged facts.

For many years statistics of an economic character, originating from trade association and government sources, have been used by management in the paper and pulp industry for guidance. However, these comparative statistics have been used chiefly for forecasting sales probabilities, and although valuable tools, do not in themselves cover all that is needed by management. Equally important are the facts developed within the confines of the single company, for underlying the facts concerning sales activities should be an equally strong urge to understand the economic and cost facts which govern the company's operations. Company management is, in fact, becoming increasingly cost conscious. However, it is evident that programs directed towards ascertaining company costs have not progressed as rapidly or comprehensively as have many other fact finding programs. This is unfortunate since adequate cost finding methods and reports are as much a tool of management in the development of profits as any of the other programs and agencies. Stated concisely, only by a thorough knowledge of its costs can the executive charged with policy formation answer such questions as: (1) Upon what type of business and in the manufacture of which kinds of paper and pulp should the company concentrate? (2) What price policies should be followed in general and in specific competitive situations? (3) What savings in unit cost will occur with increased volume in the various ranges of operation? (4) At what points and to what extent will price decreases be justified from a profit standpoint? (5) Are the highest relative efficiencies being attained within the company's operations?

The answer to at least four of these questions is fundamentally dependent upon a cost system which permits accurate calculation of costs at various levels of operation.

While direct mathematical ratios are apparent between unit costs and volume of production, the exact ratios are seldom available to management or if available are not analyzed critically by management, particularly in the smaller companies. Few concerns in the paper industry ever measure product costs at different levels of production, a fact which is borne out by the rarity of flexible budgets in the industry. Even more important than the effect upon the individual concern of lack of adequate and flexible cost data is the consequent effect upon the industry as a whole of price determination not based on costs. Competitors almost invariably, of necessity, meet price reductions with the result that the price structure either continues to fall or merely equates itself at a new level. If the downward price trends reflect reduced costs and higher profits this is of course desirable. If, however, the prices are predicated on guesswork and actually are not justified by reduced costs it is not in the interest of either public or industry Only with adequate analysis of cost and volume relationships by the individual companies can such uneconomic trends be remedied.

In a paper company operating at a low utilization of capacity, a small increase in volume will show a significant decrease of costs per unit of goods produced. This relationship is particularly true of a company with comparatively high fixed costs and has been chiefly responsible for the constant grade-shifting and general economic development of the industry. But as volume of output approaches fuller utilization, ever smaller unit savings are apparent, and the decreasing unit costs eventually cease to be of real significance. It is apparent that a decrease in price to pick up volume and yield satisfactory net operating profits by a company operating at curtailed capacity might at times be justified, besides being sound business management, but an equal arithmetic price decrease on the part of competitors would result in smaller savings of cost as competitive mills necessarily sought further to increase volume output to compensate for reduced net operating revenues. In other words volume and savings in costs are of prime importance below certain levels of production, while price becomes the more important factor above these levels of production, where unit costs remain almost constant or even rise in event of excess operation.

It is the intention of this paper to present a simple graphic method of analyzing for management the various profit relationships which occur when volume is varied within the different ranges of operation and prices are decreased to gain additional volume. It should be understood, however, that although the final presentation is clear cut and simple, the underlying data upon which the charts are based can only be obtained by means of an adequate cost accounting system. A set of figures which were changed somewhat in the interest of simplicity from those of an actual operating paper company are used for illustration. Additionally the factor of semivariable costs has been ignored, and has been included with the fixed costs in the data used. The terms "fixed costs," "variable costs," "normal operation," and "break-even point," are used consistently and are defined as follows:

Fixed Costs: those costs which are fixed in aggregate and vary with the units of output.

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Variable Costs: those costs which are fixed per unit but the aggregate varies with volume of output.
Normal Operation: that percentage of operation which the company has established as full capacity for a definite budgetary period. Actual capacity may go well beyond normal.
Break-Even Point: that point at which the total cost involved in production and sales are exactly covered by the net revenue from sales.

Curve of Overhead Costs

In a paper mill in which $50,000 per month of overhead costs have been allocated to a paper machine which is capable of producing 1,500 tons of one grade of paper, at normal operation, the curve of overhead costs per ton varies as shown in Fig. 1. It is significant that in the lower ratios of operation, small increases in the production ratio result in substantial decreases in the overhead costs per ton. Thus an increase from 30 to 40% in production results in overhead cost decrease per ton as shown in Table I.

TABLE I

Increase from	Decrease in overhead costs per ton
30 to 40%	$27.76
40 to 50%	16.66
50 to 60%	11.11
60 to 70%	7.94
70 to 80%	5.95
80 to 90%	4.63
90 to 100%	3.71
100 to 110%	3.03
110 to 120%	2.53

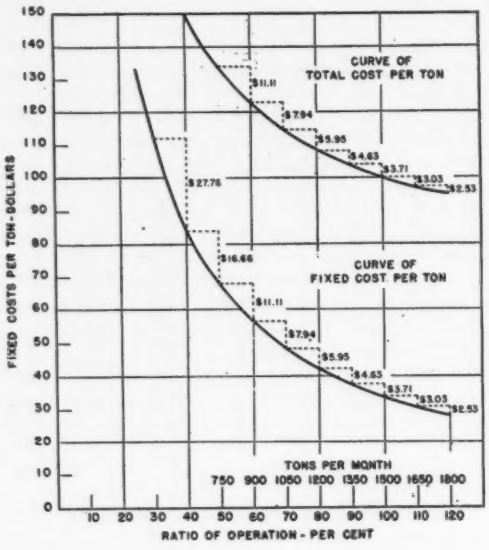

FIG. 1
Fixed Costs and Total Costs per Ton of Paper (Based on Hypothetical Costs).

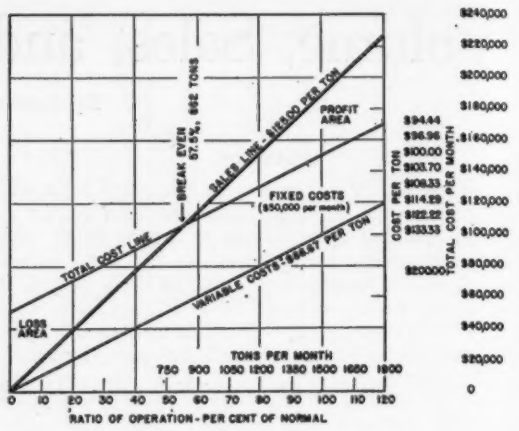

FIG. 2
Volume-Cost-Profit Relationship Showing the Break-Even Point.

This intensity of the curve will, of course, vary with the extent to which a mill has written off its fixed charges but the general relationships are similar in any case. The relative importance of the overhead costs as a determinant of company policy depends upon the value of the paper manufactured. As the grade and value of the product increases and the variable costs grow proportionately, the decrease in fixed costs become less important as a pricing factor with increases in volume of production.

Break-Even Point with a Uniform Price in Effect

If, on a basis of ratio of production, the total monthly cost of operating the paper machine is plotted against the total monthly sales of the product of the machine at any single price, a graphic analysis is obtained which shows directly the point in operation at which sales will cover all costs. Thus, in Fig. 2 the costs, as shown in Table II, are plotted for the monthly sales of the product at $125.00 per ton. Figure 2 is the ordinary "break-even" illustration often seen in business.

Straight Line Relationships

Figure 2 is self-explanatory and it will be seen that in this particular instance, all costs are covered at 57.5% of normal. It is unfortunate, however, that in practice the straight line relationship shown is

TABLE II

Level of Production (% of normal)	Tons Produced per Month	Total Fixed Cost per Month	Fixed Cost per Month	Total Variable Cost per Month	Variable Cost per Ton	Cost per Ton	Total Cost per Month
0	0	$50,000	$	$	$	$	$ .....
25	375	50,000	133.33	25,000	66.67	200.00	75,000
50	750	50,000	66.67	50,000	66.67	133.33	100,000
60	900	50,000	55.56	60,000	66.67	122.22	110,000
70	1,050	50,000	47.62	70,000	66.67	114.29	120,000
80	1,200	50,000	41.67	80,000	66.67	108.33	130,000
90	1,350	50,000	37.04	90,000	66.67	103.70	140,000
100	1,500	50,000	33.33	100,000	66.67	100.00	150,000
110	1,650	50,000	30.30	110,000	66.67	96.96	160,000
120	1,800	50,000	27.77	120,000	66.67	94.44	170,000

TABLE III

Uniform Price					Decreasing Price			
Selling Price per Ton	Profit per Ton	Total Sales per Month	Profit per Month	Operation % Capacity	Selling Price per Ton	Profit per Ton	Total Sales per Month	Profit per Month
$125.00	$	$	$	...	$...	$ ...	$	$ ....
.....	....	.....	.....	...	...	...	.....	....
125.00	8.33	93,750	6,250	50	130	3.33	97,500	2,500
125.00	2.78	112,500	2,500	60	125	2.78	112,500	2,500
125.00	10.71	131,250	11,250	70	120	5.71	126,000	6,000
125.00	17.67	150,000	20,000	80	115	6.67	138,000	8,000
125.00	21.30	168,750	28,750	90	110	6.30	148,500	8,500
125.00	25.00	187,750	37,750	100	105	5.00	157,500	7,500
125.00	28.04	206,250	46,250	110	100	3.04	165,000	5,000
125.00	30.56	225,000	55,000	120	95	0.56	171,000	1,000

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seldom achieved. It is far more likely that the company would have to decrease its selling prices in order to gain the substantial additional volume and reach the higher brackets of production necessary to extend the dollar sales in a straight line. Such decreases might or might not yield greater total profits even in the face of a decreased net profit per ton. But it is obvious that lacking accurate analysis, such movements would be based purely on guesses. The following section describes a simple method of analyzing the break-even point when production and costs are related to different selling prices.

Break-Even Point at Different Selling Prices

Assuming that the company in question must drop its price level $5.00 per ton for each 10% of additional volume sought, Table III shows the total sales per month, profit per ton, and total profit per ton at the various levels of operation.

It will be seen that under these conditions the highest profit per ton is reached at 80% of normal operation and at a sales price of $115.00 per ton, while the highest aggregate profit occurs at 90% of capacity and a sales price of $110.00 per ton. Up to the 90% level, $5.00 per ton decreases to obtain 10% additional volume for each decrease would tend to maximize the total profits. Beyond 90%, however, additional volume although increasing the total dollar sales, would only serve to further narrow profit margins per ton and would decrease total profits substantially. The reason is, of course, that the increased volume no longer decreases the costs by any significant amount and lower prices would only be justified in the amount of actual savings.

A method of analyzing these relationships is shown in Fig. 3 with the underlying calculations contained in Table IV. Taking each price ranging from $130.00 to $100.00 per ton, which are the reasonable limits for the product involved, the total monthly sales at these levels are divided by the cost of production at the various ratios of operation. The ratio obtained yields directly the per cent profit or loss at each point. Thus for example, the cost at 70% of operation is $114.29. At a sales price of $120.00 per ton the company would earn 5% on its costs for the particular machine. It should be noted that the break-even line is horizontal in Fig. 3.

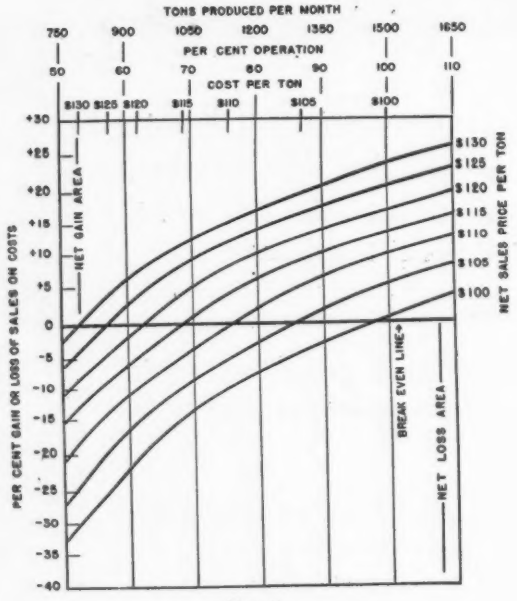

FIG. 3

Ratio of Cost of Sales to Net Sales per Ton at Different Prices and Varying Levels of Production.

TABLE IV.—SELLING PRICE AS PERCENTAGE OF COST

Price per Ton	$130	$125	$120	$115	$110	$105	$100
RATIO OF OPERATION %	Tons						
50	750	0.975	0.938	0.900	0.863	0.825	0.788	0.750
60	900	106.37	102.27	98.18	94.09	90.00	85.91	81.82
70	1,050	113.75	109.37	105.00	100.62	96.25	91.87	87.50
80	1,200	120.00	115.39	110.77	106.16	101.54	96.93	92.31
90	1,350	125.36	120.54	115.72	110.90	106.08	101.25	96.43
100	1,500	130.00	125.00	120.00	115.00	110.00	105.00	100.00
110	1,650	134.07	128.91	123.76	118.61	113.45	108.29	103.14
120	1,800	137.65	132.36	127.06	121.77	116.47	111.18	105.89

Price Declines

The company would break even at the ratios of operation and at the price levels shown in Table V.

TABLE V

Sales Price per Ton	Break-Even Point %	Additional Volume Necessary to Compensate for Price Decreases %
$130	53	..
125	57	4
120	62	5
115	69	7
110	77	8
105	87	10
100	100	13

Thus the volume necessary to compensate for equal price declines in the higher brackets of operation rise to formidable limits. Since the high volume ratios are difficult to maintain over long periods of time, it seems poor managerial policy to attempt under normal conditions to attain sustained high volume at the cost of major price concessions.

Percentage Profit on Costs

Accurate charting of such data in the form shown in Fig. 3 also provides readily the percentage profit on costs which operations will yield at any selling price and ratio of production. For instance, at 70% of normal, a price of $130 per ton would yield 13.7%; $125 per ton would yield 9.4%; $120 would yield 5%; $115 would yield 0.6%, and $110 would result in a loss of 3.7%.

Conclusion

This type of analysis is adaptable to company operations as a whole as well as to individual machines and single products. Its major difficulty lies, however, in the comprehensive breakdown of costs necessary to analysis. For any company operating on a flexible budget, the mechanical procedure is simple, but where inadequate accounting practices are in effect, a major "operation" is necessary to revise the system of cost accounts.

The value of such charts in determining company sales policy is obvious. Too seldom are the mathematical relationships which should govern such policy taken into account, particularly by the sales department which is trained to think in terms of volume instead of profits.

Refining of Groundwood Tailings*

By C. P. Reaper[1]

Abstract

Refining is divided into two classifications: the refining of primary pulps, and the refining of secondary pulps and tailings. In the latter case many mills depend on freeness as an indication of the quality of stock required from the grinder room. Freeness alone does not give the fullest information. This should be studied in connection with the size of the fibers.

With a disk refiner, designed for refining tailings, the tailings classification was 2% refined pulp retained on a 28-mesh screen and 1.2% of this was rejected in screening. This pulp was extremely fine. The mill groundwood had 12% retained on a 28-mesh and 35% fines. The freeness of the refined pulp was 145, and the mill groundwood was 74. The power conversion was 12 hp. per ton.

The subject of refining is divided into two classifications: (1) refining of primary pulps and (2) refining of secondary pulps or tailings.

This paper will deal with the refining of secondary pulps or tailings as applied to the mechanical pulping process.

The refiner manufacturers have approached the problem from different angles and are contributing towards the ultimate aim of eliminating waste and helping to produce a better pulp at lower cost. A study of the combined efforts of the refiner manufacturers may help you to get an indication of what is required in the making of a better quality pulp.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Roosevelt Hotel, New York, N. Y., Feb. 17-20, 1941.

[1] Manager, Canadian Ingersoll-Rand Co., Montreal, Que.

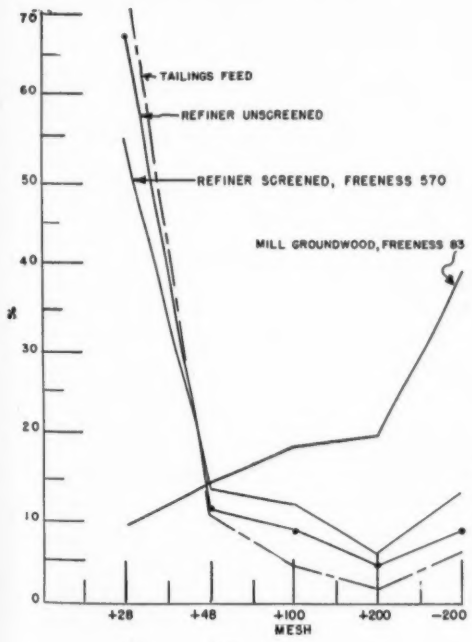

FIG. 1

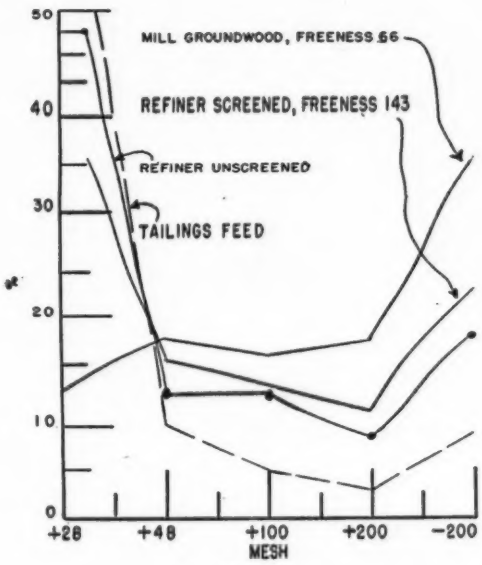

FIG. 2

Groundwood Control

Many mills depend to a large extent on freeness as an indication of the quality which they require from the grinder room. Freeness alone does not give the answer to the problem. This should be studied in connection with the size of the fibers or the screening of the fibers. If it was possible to segregate the coarse, medium, and fine fibers and keep these in separate tanks, the mill, after a little experience, would be able to mix these in such a way as to obtain the best homogeneous mixture to give the best quality of paper. You might compare such a system to the mixing of concrete, where you require different grades of coarse, medium, and fine aggregates to give you different strengths and qualities. So far there has been no real method of separating these fibers individually so that you have them in a form which you can use immediately. Some screen classification tests are shown in Figs. 1 to 4.

Figure 1 shows that the tailings retained were over 70% on a 28-mesh screen, with less than 10% on a 48, 100, and 200 screens, together with 6% passing the 200. One type of refiner was used to try to give the mill long fibered stock, because they claimed they already had too many fines. The results are as shown in this chart. The largest percentage was retained on the 28-mesh screen, and after screening 54% was still retained on the 28-mesh. The freeness was 570 for the refined pulp, whereas the mill groundwood was 83.

The power consumption was 35 horsepower per ton which is considerably less than is common on grinders.

In Fig. 2, the tailings screen classification is practically the same as in Fig. 1. In this case 35% of the refiner screened stock was retained on the 28-mesh screen. An examination of the pulp on a blue

glass indicated long fibered pulp. Unscreened refined pulp had 27% rejected in screening. The mill's regular groundwood has only 12% retained on the 28-mesh and 35% fines passing the 200-mesh. The freeness of the refined stock was 143, and the mill freeness was 66.

The power conversion was 50 horsepower per ton which was about 20 horsepower less than used on the grinders.

In Fig. 3 the tailings classification is similar to the other figures. There was only 2% refined pulp retained on the 28-mesh screen and 1.2% of this was rejected in screening. This pulp on a blue glass was extremely fine and all dirt was disintegrated. The mill groundwood had 12% on the 28-mesh and 35% fines. The freeness of the refined pulp was 145 and the mill groundwood was 74. The power conversion was 12 horsepower per ton.

In Fig. 4 the tailings classification remains fairly constant with the other mills. In this test 9% refined pulp was retained on the 28-mesh screen. On the blue glass this pulp indicated a fairly long-fibered stock. The mill groundwood had 14% on the 28-mesh and 32% passing at 200-mesh. The freeness of the refined pulp was 560, and the mill groundwood was 96.

The power conversion was 6 horsepower per ton.

Kinds of Tailings

There are four principal tailings losses in a groundwood mill; namely, (1) bull screens, (2) sawdust, (3) knotters, and (4) fine screens.

The refiner manufacturers have been asked to mix all four and then put them through a refiner and obtain a uniform refined pulp. This is not an easy result to accomplish. Items 2, 3, and 4, however, have been put through with results similar to those shown in Fig. 3, where the product was used as a filler for the sheet.

Bull screen rejects in most cases should have a preliminary treatment before being put into a refiner. There are a number of groundwood installations where all these tailings are treated and returned to the system. This gives a closed system, with savings in heat, pulp, and white water. In closing the system the fine screen perforations have been reduced in some cases from 0.075 inch to 0.060 inch, thus producing a cleaner sheet.

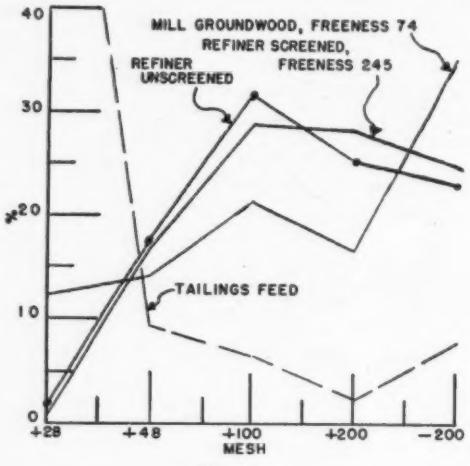

FIG. 3

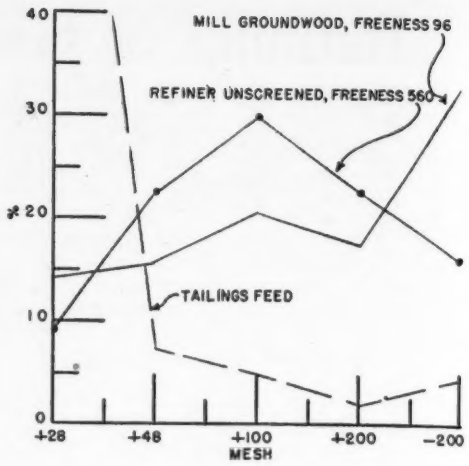

FIG. 4

Haug Refiner

At the present time, holding a log against a stone to produce pulp requires up to 75 horsepower per ton; less than 1 horsepower per ton is theoretically required. Some of the heat generated is of value but much is lost. To improve horsepower requirements, bearing manufacturers have replaced the old style sleeve bearing with ball and roller bearings. The Haug refiner is equipped with antifriction bearings.

Low Power Consumption

The refiner consists of a cylindrical shell, inside of which rotate 6 rolls. The rolls are free to turn due to the friction between the pulp and the rolls. They also are thrown out by centrifugal force which helps to treat the tailings. This type of machine gives a low power consumption, and tailings have been treated at 4 to 7 horsepower per ton. In other words, much of the grinder waste-friction has been eliminated, and the power is going into useful work.

Liquid Resins of Abietic Acids

A new booklet entitled "Hercolyn and Abalyn, Liquid Resins of Abietic Acid" has just been issued by Hercules Powder Company. Two properties of the liquid resins, excellent fiber-wetting and refractive indexes approaching that of cellulose ordinarily used in paper, indicate their use for the production of transparent and translucent paper.

Hercolyn, the booklet says, imparts to resinous adhesives improved protection against moisture penetration, resistance to sweating and adhesion to porous and non-porous surfaces, such as metal foil, metal, highly sized paper, lacquered surfaces and cellulose foils, particularly when combined with nitrocellulose, ethyl cellulose, rubber, Pliolite, chlorinated rubber, and vinyl acetate chloride adhesive bases.

The booklet gives data on ester content, refractive index, specific gravity, acid number, saponification number, color, viscosity, flash point, flame point, vapor pressure, boiling point, thiocyanate value, weight and specific rotation of the resins.

Tables and graphs of vapor pressure, thermal stability and electrical characteristics and typical emulsion formulations are included.

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Prosize and Certain Aspects of Rosin Sizing*

By H. J. Hotz[1], T. T. Collins, Jr.[2], and H. L. Davis[3]

Abstract

The behavior of Prosize as related to the "colloidal-electrostatic" theory of sizing is discussed, and photomicrographs show its stability toward the precipitating and agglomerating effects of the various chemicals in the papermaking furnish compared to the stabilities of ordinary rosin sizes. Some data concerning the economics of the application of Prosize to meet a difficult sizing requirement are given.

Moritz Illig, credited with the invention of rosin sizing in the beater using alum as the precipitating material as early as 1807 *(1)*, advanced the theory that free rosin is responsible for the phenomenon of sizing. Subsequently, Orioli *(2)* advanced the aluminum resinate theory which was not questioned or investigated until Würster repropounded Illig's original free rosin theory in 1878. From that time until Stöckigt and Klingner *(3)* in 1921 suggested the colloidal theory of rosin sizing there was much controversy between the two schools of thought but little experimental evidence to back either argument.

Sutermeister *(1)*, Klein *(2)*, and Olsen *(4)* have reviewed the various theories as to the mechanism of sizing as well as most of the experimental work up to within the last 7 years. Collins *(5)* has recently extended these summaries, particularly with reference to the role of alumina in sizing and the colloidal behavior of the components of the water-pulp-rosin size-alum system. For this paper, written for papermakers, there is no need to discuss the theoretical considerations involved in an understanding of the nature of the materials in the papermaking system, but an attempt will be made to summarize the fundamental reactions which make up the mechanism of the sizing of paper.

Illig's suggestion *(6)* was that sizing results from the precipitation of free rosin in its original form from rosin soap due to the acidity resulting in the system from the hydrolysis of the alum. This free rosin-acid precipitation theory alone does not have much foundation because, although acidic materials will precipitate rosin in the sheet, it is a well known fact that permanent sizing will not result unless some mordanting material is present. Bialkowsky *(7)* has shown that the hydrolysis of sodium resinate, which is increased by the adsorption of sodium hydroxide by cellulose, yields free rosin which produces a high degree of sizing if alum is present. The successful application of high free rosin sizes for many years shows that free rosin is an excellent sizing material, but the added effect of alumina from alum is needed before the mechanism of sizing is effected.

Sutermeister *(1)* lists a number of paper chemists who have long supported the aluminum resinate theory of rosin sizing. This theory holds that a chemical combination between sodium resinate and aluminum sulphate gives aluminum resinate which produces sizing. Robinson *(8)*, a recent proponent of the theory that aluminum resinate is formed, showed that a material, apparently aluminum resinate, is precipitated on the pulp fibers along with abietic acid or free rosin which Bialkowsky *(7)* has shown results from the hydrolysis of sodium resinate in the presence of pulp, due to the hydrolytic adsorption of alkali by the cellulose. He *(8)* admits that high free rosin sizes would form little aluminum resinate, and this may account for the higher sizing efficiency resulting when highly saponified sizes are replaced by high free rosin sizes. This difference may not be due to the suggested mechanism that aluminum resinate has little sizing effect, but may be dependent upon a difference in the particle sizes of the precipitated rosin complex in the two cases. However, before the aluminum resinate theory is given further consideration, x-ray analyses should be made to determine whether or not such a compound actually exists. It may be that aluminum resinate is merely an adsorption complex of alumina and abietic acid.

Stöckigt and Klingner *(3)* attacked the problems of sizing phenomena with an entirely different conception from that held by earlier investigators. They used rosin hydrosols for sizing and found that the presence of alumina is essential in producing a sized sheet. Their classic explanation was that the alumina and rosin form an adsorption compound, and that this colloidal complex is adsorbed by the cellulose. This was the first statement of the colloidal theory of rosin sizing.

A great step toward the understanding of this phenomenon was taken when Ostwald and Lorenz *(9)* published a study of the colloidal behavior of rosin hydrosols. They explained sizing on the basis of the electrostatic behavior of the components of the papermaking system. By electrophoretic experiments they showed that pulp in distilled water migrates to the anode and hence is negatively charged. By treating the pulp with alum the charge and direction of migration of the fibers were reversed; therefore alum produces a positive charge on the fibers. These data were the basis of the colloidal-electrostatic sizing theory which today appears to be the complete picture of the behavior, although not the nature, of the components of the papermaking system. This theory is that the addition of positively charged alumina or aluminum hydroxide from alum to a system composed of negatively charged rosin particles and fibers causes the interfacial potentials between the two negatively charged materials to be lowered to such a degree that precipitation of the rosin onto the fiber by the flocing action of the alum takes place. They *(9)* offer data to show that sizing efficiency is highest at the isoelectric point where the negative and positive charges in the system are equal, and that too much alum will tend to make the system positively charged with the result that a mutual repellency exists between the rosin and the fibers with a consequent decrease in sizing. A decrease in sizing was observed if the system were too negatively charged as when insufficient alum is added. The same conclusions were reached by Kanamaru and

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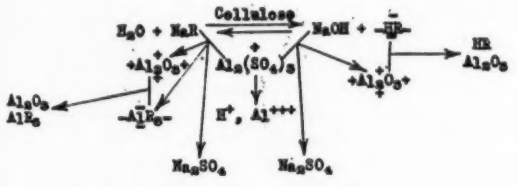
[3] Member Research Staff, Johnson & Johnson, New Brunswick, N. J.

Tsuchida *(10)* who made studies of a similar nature. They found that thorium and alumium chlorides change negatively charged rosin sols to positively charged sols, but aluminum sulphate leaves the particles still negatively charged. They explained this discrepancy in theory on the basis of a lowering of the normal, mutual, electronegative, repulsive forces between the fibers and the rosin particles due to the presence of an insufficient, from the standpoint of electrostatic neutralization, amount of positively charged alumina from alum. The work of Collins *(5)* has shown this variance in theory is due to the fact that the sulphate ion from alum adsorbed on the alumina tends to increase the negative charge of the alumina or reduces the positive charge.

Wieger *(11)* believes that colloidal sizing is not due to electrostatic forces but to the mordanting action of the alumina. However, his various technical papers *(11, 12, 13)* bear out most of the colloidal considerations involved in rosin sizing. Most investigators believe that mordant action depends largely on electrostatic forces, an opinion which Wieger apparently does not hold.

Sutermeister *(1)* discusses much of the work done in developing this theory by other investigators, and it can be said that, with the exception of Robinson's work *(8)*, most of the latest evidence bears out the colloidal theory of rosin sizing. Robinson's research did not cover the mechanism of the sizing effects, but was the determination of the presence of aluminum resinate in paper, a complex that would still have to act as a colloid to produce sizing.

Rowland *(14)* has outlined by means of the following diagram the possible reactions which might occur in the papermaking system with reference to the chemical and electrostatic behavior of the components:



Collins *(5)*, by means of electrophoretic measurements, has demonstrated the validity of many of the ideas concerning the colloidal theory of sizing and presents some evidence as to the mechanism of sizing, particularly with reference to the role of alumina in the process. Therefore, on the basis of the assumption that the colloidal-electrostatic theory of sizing is correct for the most part, we shall try to show the importance in the papermaking system of some of the colloidal and chemical reactions which constitute the mechanism of rosin sizing.

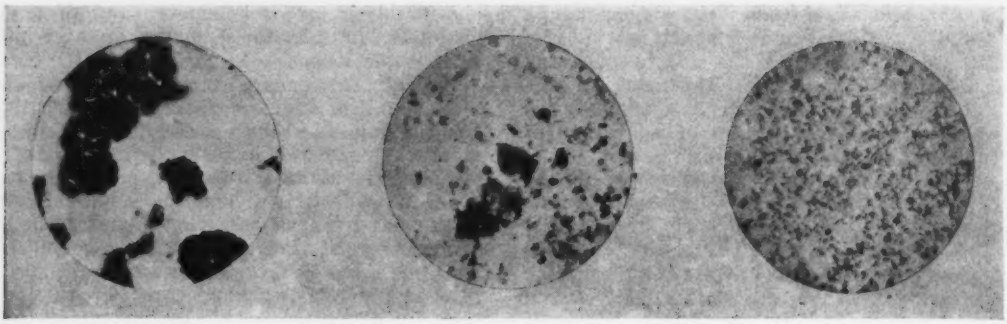
Apart from the theoretical considerations involved, however, there are many sizing problems of a practical nature. In general, sizing is produced by the precipitation of free rosin-alumina complex in some form on the cellulose fiber. The finer these precipitated particles are, the greater their distribution in the sheet and the larger is the area of fiber surface covered. It is a well known fact that in order to precipitate the rosin suspension in the paper furnish, some acidic material must be added. The addition of various acids will produce free rosin in the sheet which is held mechanically, but experience has shown this sizing to be uneven and of temporary character. In order to set the size onto the fiber surfaces after it has been precipitated by the acidic material, a mordanting material such as alumina, aluminum hydroxide, or hydrous alumina is required. By using alum in sizing, we supply the acid and the mordant together. This simply means that under ordinary conditions electropositive alumina resulting from the hydrolysis of alum mordants or flocs electronegative rosin particles precipitated from the size solution by the sulfuric acid in the alum onto the electronegative surfaces of the cellulose fibers. It is also possible to precipitate rosin from solution by salts such as calcium chloride and magnesium sulphate, but good sizing efficiency is not obtained unless some hydrous oxide such as alumina is present. Other heavy metal salts, such as those of chromium, iron, and thorium, also produce these all-important, from the standpoint of sizing, hydrous oxides. Sodium aluminate or alkaline alumina is used for sizing in conjunction with alum where a reduction in the acidity of the papermaking system is desired without a corresponding decrease in the alumina content, or where the use of an acidic raw water would prevent the addition of sufficient alumina to give the desired mordanting action without excessive acidity.

Colloidally Protected Size

The development in recent years of a colloidally protected rosin size has brought with it a good deal of evidence as to the actual mechanism of rosin sizing. It should be pointed out that while ordinary rosin size is a suspensoid of rosin particles protected by a film of sodium resinate and is thus colloidally protected, the protective agent being what it is, accounts for many of the faults an ordinary rosin size has in common with a highly saponified size. Colloidally protected sizes consist of free rosin particles with a sufficient amount of a hydrophilic colloid such as protein adsorbed on the colloidal surfaces to stabilize the suspension.

Prosize is a size of this kind. According to Rowland and Bain *(15)*, the history of the development of this size *(16)* is one in which the theoretical bases were first laid down and the practical results were made to conform as closely as possible. Essentially, it is composed of free rosin particles, some of which are produced by the hydrolytic adsorption of alkali from sodium abietate by alpha protein which in turn stabilizes the rosin particles *(15)*. The balance of the free rosin results from the introduction of boric acid into the size which acts as a buffer and reduces the alkalinity of the system. They claim that by this double-step molecular condensation, a rosin size of any desired ratio of free to combined rosin is produced, and the particle size range extends to the ultramicroscopic.

When we consider the improvements from the standpoint of paper machine operation and the economic advantage which Rowland and Bain have established from the introduction of this material as a replacement for ordinary or highly saponified size, we see the importance of comparing these various types of sizes from the theoretical viewpoint. For comparative purposes it is sufficient to discuss three sizes: one, an ordinary size of about 30% free rosin; two, a neutral or completely saponified size; and three, a colloidally protected high free rosin size which is approximately 90% free rosin.



A FIG. 1. B C

Chemical Added, Alum; Chemical Concentration, 1.5%. A—HSS Size; B—CSS Size; C—PS Size.

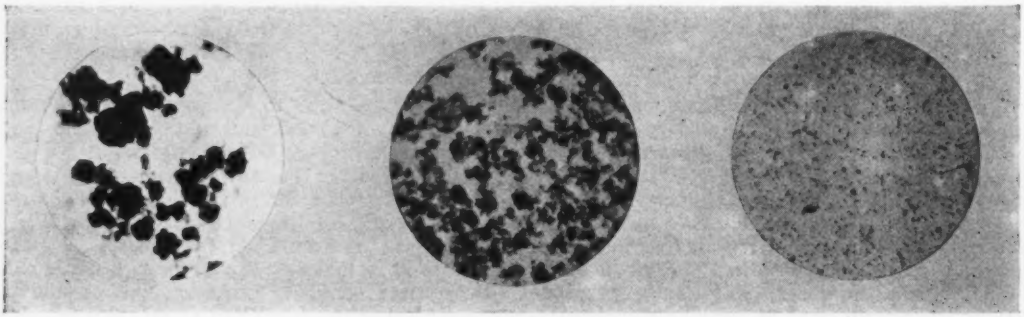
According to Robinson *(8)*, sodium resinate or highly saponified size reacts with aluminum sulphate to form aluminum resinate which may not give good sizing. The reaction of alum with a high free rosin size would give little aluminum resinate or abietate due to the low saponification of the size and the sizing mechanism would be colloidal to a great extent due to the flocing of free rosin by alumina. The alum-Prosize reaction product is apparently an adsorption complex of $Al_2O_3 \cdot xH_2O$ on the outside of free rosin particles protected by an intermediate film of protein. The sizing mechanism of the latter is much different from that of the first two because the film surrounding the free rosin particles in suspension is protein instead of sodium resinate or rosin soap. In other words, the electrostatic sizing behavior of Prosize is that of a colloidal particle of alpha protein and it should be considered in that light.

The importance of the degree of dispersion or the particle size of the precipitated rosin in the papermaking furnish has been emphasized by Lee *(17)*, Strachan *(18)*, Wieger *(11, 12, 13, 19)*, Dennett and Libby *(20)*, Rowland and Bain *(15)*, and many others. They agree that the smaller the particle size, the higher the degree of sizing. It appears from the data presented by Dennett and Libby *(20)* that best results are obtained with a rosin hydrosol whose particles are 0.5 microns or less in radius before precipitation in the sheet. When alum is added to a highly saponified size, the resulting molecular condensation and particle growth of the precipitated rosin either as a free rosin—$Al_2O_3 \cdot xH_2O$ complex or aluminum resinate is not controlled and the particles may become comparatively large. When the size hydrolyses in the presence of pulp, as shown by Bialkowsky *(7)*, to give a large amount of free rosin, the highly saponified size will then act as a high free rosin size to some extent and the precipitated particle size might not exceed the limit for good sizing. This marked difference in precipitated particle size, however, accounts to some extent for the better sizing resulting from the use of a high free rosin size instead of a highly saponified size.

Adding alum to ordinary size may produce precipitation on the fiber to give good sizing. Obviously, this does happen at times in many mills. The fact that the conditions for such a "perfect procedure" are so variable and hard to control is probably one of the chief reasons why we revert to the "trick" sizes whose principal virtue is their relative insensitivity to these conditions.

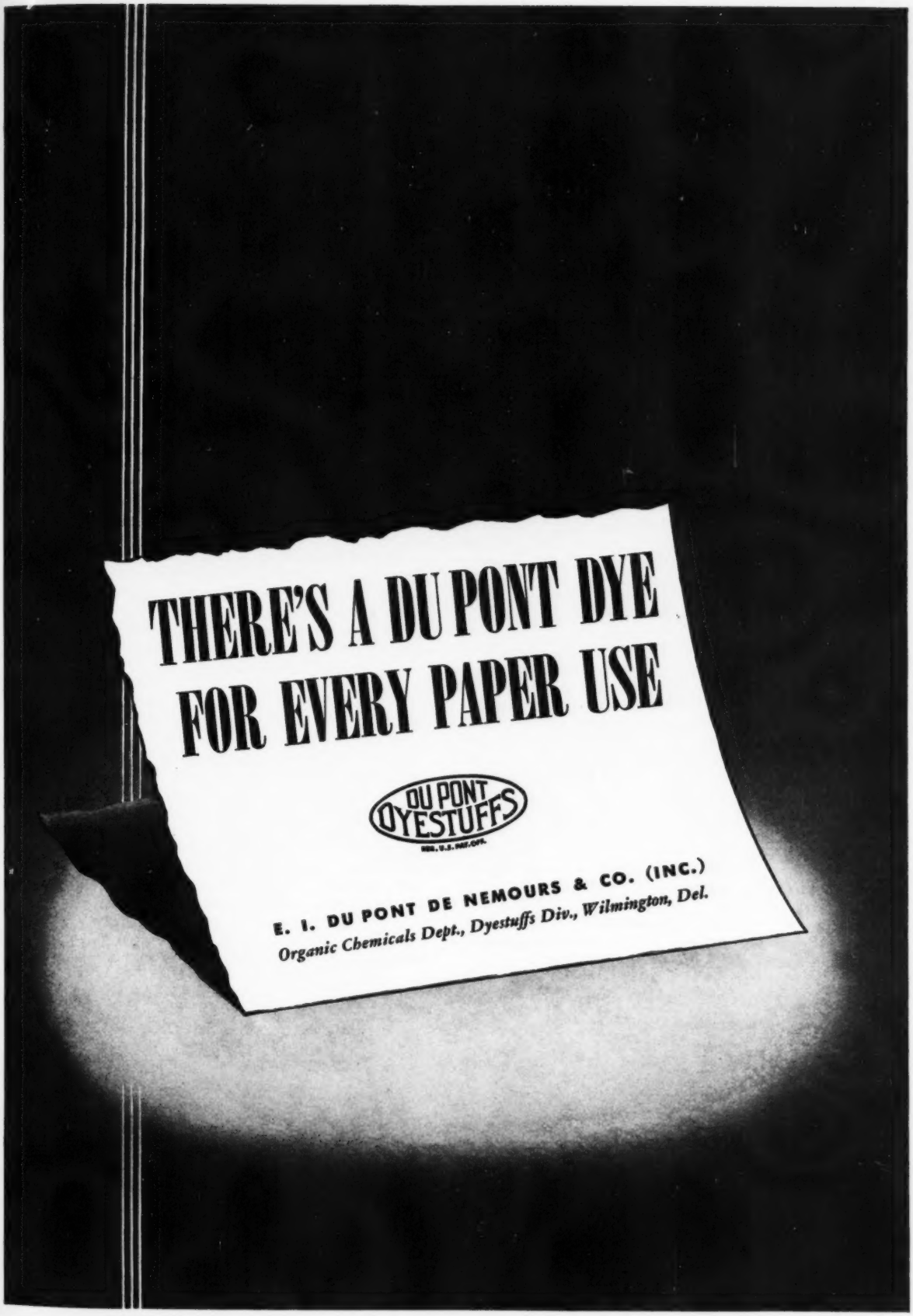
From the standpoint of practical results, the size, which in suspension would have the smallest average particle radius and more importantly, the least tendency of these particles to agglomerate when precipitated by various materials, would give a greater particle distribution throughout the sheet, resulting in increased and more uniform sizing. Theoretically, because of the stabilizing action of the protein, Prosize should possess this important advantage.

Sutermeister *(1)* has reviewed in most cases the many theories concerning the deleterious effects on sizing of various chemicals which occur in the papermaking furnish. Fundamentally, these troublesome effects are due to one or more of three causes: (1), the excessive acidity of the sizing system, particularly when there is an insufficient amount of alumina present; (2), the effects of bleach liquor residues and water hardness; and (3), the influence of sulphate ion on the electrostatic charges of the components of the papermaking system. Here too, Prosize should be superior because of the weakly electronegative



A FIG. 2. B C

Chemical Added, Sulphuric Acid; Chemical Concentration, 1.5%. A—HSS Size; B—CSS Size; C—PS Size.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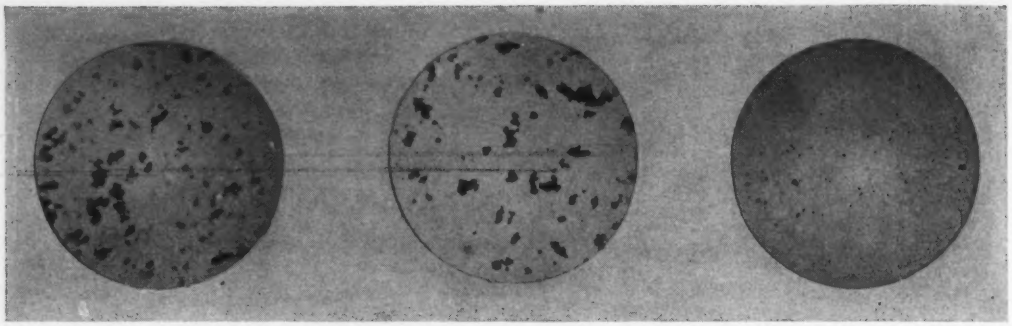


A FIG. 3. B C

Chemical Added, Sodium Sulphate; Chemical Concentration, 1.5%. A—HSS Size; B—CSS Size; C—PS Size.

nature of the protective colloid it employs at papermaking hydrogen ion concentrations.

In order to check some of the more important theoretical considerations involved, a simple technique has been employed using a highly saponified size of about 30% free rosin designated as HSS, a completely saponified or neutral size designated as CSS, and Prosize designated by PS. Systems were made up which were 1% with respect to rosin and contained various amounts of other chemicals usually found in the papermaking system. After allowing several minutes for coagulation of the sizes, slides were prepared and photomicrographs were taken at a magnification of 75 diameters.

Stability of Sizes

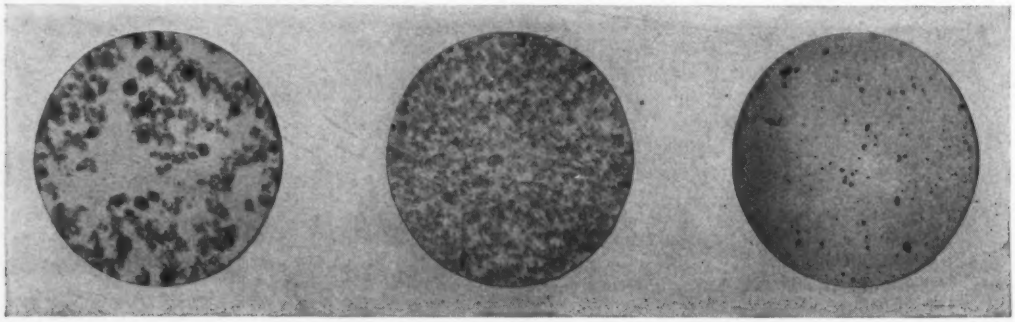
These photomicrographs show the relative stability of Prosize compared to more highly saponified rosin sizes under a rigorous method of comparison. It *cannot* be assumed that these reactions take place to any such marked degree in the papermaking system because one of the important components, cellulose, is not present in these idealized experiments.

The stability tests of Fig. 1 show that Prosize particles precipitated by alum are small compared with ordinary and neutral size particles precipitated under equivalent conditions. In a paper furnish this property would appear as a more uniform distribution of finer size particles in the sheet with a consequent increase in degree and uniformity of sizing. Figure 2 shows the agglomerating effects of the sulphuric acid on the sizes. Prosize, because of the protein film surrounding the free rosin particles, is not affected nearly so much as are the other two sizes.

If a closed white water system is used in conjunction with a paper machine, there is some precipitating effect due to the presence of sodium sulphate which builds up in concentration in the system. The relative stabilities of the sizes toward the effects of this substance are shown by Fig. 3. Although the addition of calcium hydroxide to the size systems does not reduce their alkalinity; nevertheless, the precipitating effect of this material, as shown by Fig. 4 is marked in the case of ordinary and neutral sizes due to the formation of water insoluble calcium abietate. The ability of Prosize to withstand the deleterious effects of the calcium ion immediately suggests its use where hard water is used in the papermaking system or bleach liquor residues remain in the pulp.

In order to observe the magnitude of some of these effects in actual papermaking furnishes, studies were made using a higher magnification. At a magnification of 430 diameters the higher colloidal stability of Prosize is still evident although the agglomerating effects are not nearly so large as they are in the stability tests.

The precipitating and agglomerating actions of alum, sulphuric acid, calcium hydroxide, and/or sodium sulphate are much greater in the papermaking furnish on ordinary rosin sizes than on protein-protected size. It can be estimated roughly that in the presence of the various chemicals employed in the stability tests the agglomerates of precipitated size particles in the furnish appear to the eye at a magnification of 430 diameters to be the same relative proportions as the particles shown for each precipitant and size by the photomicrographs at 75 diameters. This ordinarily means that while the ag-



A FIG. 4. B C

Chemical Added, Calcium Hydroxide; Chemical Concentration, 0.1%. A—HSS Size; B—CSS Size; C—PS Size.

glomerating effects of the chemicals in a paper furnish are about one sixth as great as they are in the stability tests; nevertheless, they are still comparative for the different sizes.

Beating reduces the dimensions of the agglomerates of any type of size although not the dimensions of the individual, precipitated particles. It appears that beating results in a decrease in the quantity of size agglomerates suspended in the white water in the beater, although the magnitude of this effect is not known. Probably the hydrolysis of the size before the alum is added and the prolonged mechanical action result in more of the rosin-alumina complex being adsorbed on the surface of the fiber or mechanically entrapped by the fibrillated cellulose.

Prosize particles precipitated in a furnish are difficulty resolvable even at a magnification of 430 diameters, because few of the particles are of sufficient size to be seen, the agglomerates are composed of only a few primary particles, and probably most of the size is mordanted onto the fiber.

The use of a size containing about 30% free rosin with sodium resinate as the sole stabilizing agent represents the worst possible condition from the standpoint of colloidal stability, although there is a slightly lower alum requirement with that type of size than there is with a neutral size which contains more alkali.

Relative Cost of Sizing

As important as the stability of a size is its behavior in the furnishes on the paper machine and the costs and tests of the resultant papers. For example, a manufacturer decided to increase the ink flotation tests of a special food wrapper by approximately 50%. Casein and special wax sizes were added in the sizing system in addition to the regular size and alum. This resulted in an improved product but higher cost was entailed as well as some operating difficulties. Using the casein-wax-rosin size mixture in sufficient quantity to give the desired sizing resulted in the loss of several hours a day as machine time while the wire was steamed and soured to remove a wax-rosin-alumina-calcium deposit. The substitution of Prosize as the sizing material eliminated the operating troubles and lowered the cost of the improved product as is shown by the following figures:

SIZE 1 (old formula): A 30% free rosin size was used and alum was added to keep the machine pH in the range 6.0 to 6.5.

	Materials used %	Sizing costs (basis old formula) %
Alum	3.27	....
Size	2.28	....
Total	...	100.0

SIZE 2 (improvement formula): A 30% free rosin size, wax-rosin size, and casein were used and alum was added to keep the machine pH between 4.5 and 4.9.

	Materials used %	Sizing costs (basis old formula) %
Alum	4.63	....
Size	3.12	....
Total	...	180.0

SIZE 3 (present formula): Prosize was used and the paper machine pH was maintained at 5.3 to 5.8, hence there was no alum saving effected over the use of regular size at a lower alum concentration.

	Materials used %	Sizing costs (basis old formula) %
Alum	3.97	....
Prosize	1.74	....
Total	...	112.6

The final result was a 50% improvement in sizing over the old formula at a cost increase of 12.6%. The desired sizing increase attained with Prosize would have been difficult to produce and far out of line as concerns costs with ordinary rosin size.

Conclusion

The regular distribution of precipitated Prosize particles in the sheet produces more uniform and a higher degree sizing than large, agglomerated, unevenly distributed masses resulting from ordinary size.

Prosize is stable toward precipitation by the undesirable constituents of the papermaking system which are, sulphuric acid, sodium sulphate, and occasionally the salts of calcium and magnesium. Prosize may be used advantageously with an extremely hard water or a water of acidic character. In the latter case, if hydrogen ion concentration is used as a measure of the amount of alum to be used in the furnish, as it generally is, then Prosize would give better sizing than rosin soap because it requires less alumina at a higher pH to give the desired mordanting of the size onto the fiber.

Prosize requires less alum than ordinary size not only for electrostatic neutralization but also to produce the same hydrogen ion concentration in the furnish. Prosize will also give improved sizing in systems where acidity or high alumina content in the sheet are undesirable.

Because of its low content of rosin soap, Prosize does not have as great a tendency to foam as does ordinary size. The protective colloid, alpha protein, used in Prosize is of a nonsticky nature and the use of this size reduces the frequency with which the wet paper sticks to the wire, press rolls, and felts of the paper machine. When it is the regular component of a furnish using unwashed semibleached pulp, calcium fillers, or hard water, the formation of calcium abietate deposits throughout the system is almost completely eliminated.

Because of the high free rosin content of Prosize, it does not form aluminum resinate like ordinary sizes do. The simplicity of the preparation of Prosize from ordinary rosin milk without an investment in expensive equipment makes its manufacture applicable to the size emulsification systems in use in most mills.

Acknowledgment

Acknowledgment is made to G. Mullen of the Central Paper Company for the photomicrographs used in this paper.

Literature Cited

(1) Sutermeister, E., *Paper Trade J.* 97, no. 4:18, 21-25; no. 21:26-28, 31; no. 22:20-25 (July 27, Nov. 23, 30, 1933).
(2) Klein, Arthur St., *Zell. u. Papier* 9:370-373 (1929).
(3) Stöckigt, F., and Klingner, A., *Papier-Fabr., Fest-u. Ausland Heft:* 50-60 (1921).
(4) Olsen, S. R., *Paper Trade J.* 87, no. 15:59-63 (Oct. 11, 1928).
(5) Collins, T. T., Unpublished work, The Institute of Paper Chemistry.
(6) Illig, *Papier-Ztg.* no. 34-41 (1887). A reprint of Illig's original article.
(7) Bialkowsky, Harold W., *Paper Trade J.* 97, no. 13:29-46 (Sept. 28, 1933).
(8) Robinson, Samuel J., *Paper Trade J.* 103, no. 7:104-112 (Aug. 13, 1936).
(9) Ostwald, Wolfgang, and Lorenz, Rudolf. *Kolloid-Z.* 32:119-137, 195-209 (1923).
(10) Kanamaru, Kisou, and Tsuchida, Takeshi, *J. Soc. Chem. Ind.* (Japan) 36: Suppl. binding 102-110 (1933); C. A. 27:3072 (1933).
(11) Wieger, Bruno, *Künstdunger u. Leim* 32:81-85, 111-114 (1935).
(12) Wieger, Bruno, *Papier-Fabr.* 28:113-116 (1930).
(13) Wieger, Bruno, *Paper Trade J.* 101, no. 5:33-37 (Aug. 1, 1935).
(14) Rowland, B. W., *J. Phys. Chem.* 41:997-1005 (1937).
(15) Rowland, B. W., and Bain, W. M., *Paper Trade J.* 110, no. 17:33-36 (April 25, 1940); *Tech. Assoc. Papers* 23:377-380 (June, 1940).
(16) Rowland, B. W., U. S. patent 2,166,768 (May 10, 1938).
(17) Lee, H. N., *Paper Trade J.* 103, no. 27:32-36 (Dec. 31, 1936).
(18) Strachan, James, Paper Maker and British Trade J. 82, nos. 3, 4, and 5.
(19) Wieger, B., British patent 335,902 (July 1, 1929).
(20) Dennett, Firth, and Libby, C. E., *Paper Trade J.* 109, no. 15:37-43 (Oct. 12, 1939); *Tech. Assoc. Papers* 23:617-623 (June, 1940).

Floc-forming Chemicals*

By Lewis B. Miller[1]

Abstract

In the papermaking processes attention and emphasis are centered upon the fibers and other solid materials rather than water, nevertheless the bulk of raw material present is water. From the technical angle the operator is chiefly concerned with controlling the liquid phase of the raw materials, thus if it is necessary to treat fibrous raw materials with a chemical reagent, the quantity of reagent in comparison with the quantity of fibrous materials is usually of minor importance; the important factor is the quantity of reagent as compared with the quantity of water.

If it is necessary to induce floc formation it is the concentration of the floc-forming chemicals with respect to the water, the hydrogen ion concentration of the water, the concentration in the water of accessory ions, the water temperature, etc. which determines whether proper floc formation will take place.

It is one of the objectives of this paper to direct attention to and discuss the importance of water from the technical viewpoint in the manufacture of paper and paper products.

Introduction

In the manufacture of paper the raw materials at the time of sheet formation consist of 2% or less of various fibers, fillers, pigments, and binding materials and of 98% or more of water. Where floc-forming chemicals are made use of, one of their primary functions is to condition the water with its small percentage of suspended "impurities" of a fibrous or finely pulverized nature. Paper manufacturers normally allocate undue attention to the solid "impurities" present in the water suspension because it is these materials which appear in the final sheet of paper and represent a product of economic importance. Technically, however, the important raw material is the water, for if the water is properly conditioned and processed, the products of economic importance will make their appearance in due form at appropriate points in the manufacturing operations.

One of Most Important Types

From this point of view it is clear that an understanding of the chemistry of water and of those chemical reagents used to condition water is of primary importance to paper manufacture. One of the most important types of water conditioning agents is the floc-forming chemicals. It is the purpose of this article to discuss some of the technical aspects of these reagents in their relation to paper manufacture. In the pursuance of this objective it is the intention not only to present new data on the chemistry of floc formation but also to interpret well verified data obtained from other fields of scientific and technical endeavor in terms of paper manufacture.

At the present time floc-forming chemicals are made use of in the pulp and paper manufacturing processes for the following: (1) To condition the process water so that rosin size or other sizes will tend to separate from it and to adhere to the fibrous and other solid "impurities" suspended in it (to set the sizes). (2) To condition the process water so that fillers will tend to separate themselves from the water and to adhere to the fibrous materials which it is desired to remove from the water suspension (to aid in retention of fillers). (3) To perform a similar function for dissolved or suspended colors. (4) To clarify raw waters for use in manufacturing operations or for power purposes by encouraging the separation in suitable form of naturally occurring suspended matter. (5) To clarify white waters in save-alls by processing the waters so that suspended fibrous and solid bodies will separate in forms suitable for mechanical separation from the water. (6) To assist in clarifying waste waters before discharging them to streams, lakes, or other natural waters. (7) For certain special purposes.

Great Care Must Be Exercised

In interpreting data, obtained in some other field into terms of paper manufacture, considerable care must be exercised. For example, one of the most valuable sources of information on floc-forming compounds is the literature on potable water clarification. In attempting to interpret this information in terms of paper manufacture, cognizance must be taken of the fact that alum and other floc-forming compounds are used in extreme dilutions in potable water clarification, whereas in many of their uses in the paper mill these floc formers are used in more moderate dilutions. While many of the same general principles apply in both fields, specific applications are often quite different. Anyone attempting to take the results and conclusions obtained from the field of potable water and to apply them indiscriminately to all conditions of usage in paper manufacture would become hopelessly involved in error. Thus in potable water treatment alum is generally used in amounts of approximately 17 to 51 parts per million (1 to 3 grains per gallon). In raw water treatment for the paper mill or in the treatment of waste waters alum may be used in similar dilutions and here the results from the field of potable water are directly applicable. Consider on the other hand a beater furnish containing 100 pounds of alum per ton of total furnish. At the stuff chest assume the stuff to contain 2% solids; the alum then has a concentration of 1000 p.p.m. or about 20 times the upper limit generally used in potable water treatment. Now assume a further dilution so that the stuff at the screen or cylinders has a concentration of 0.4% solids. The alum concentration is then 200 p.p.m. or still well above the concentrations used in potable water treatments. The behavior of alum in these two ranges of concentration is in many respects quite different.

While alum is the primary floc-forming chemical used in the paper mill, it is not the intention to limit the present article to a discussion of alum. Other reagents which will be discussed are already finding use or may in the future find use in paper manufacture. Some which will be discussed may never, for technical or economic reasons, find use in the

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BLEACHED AND UNBLEACHED

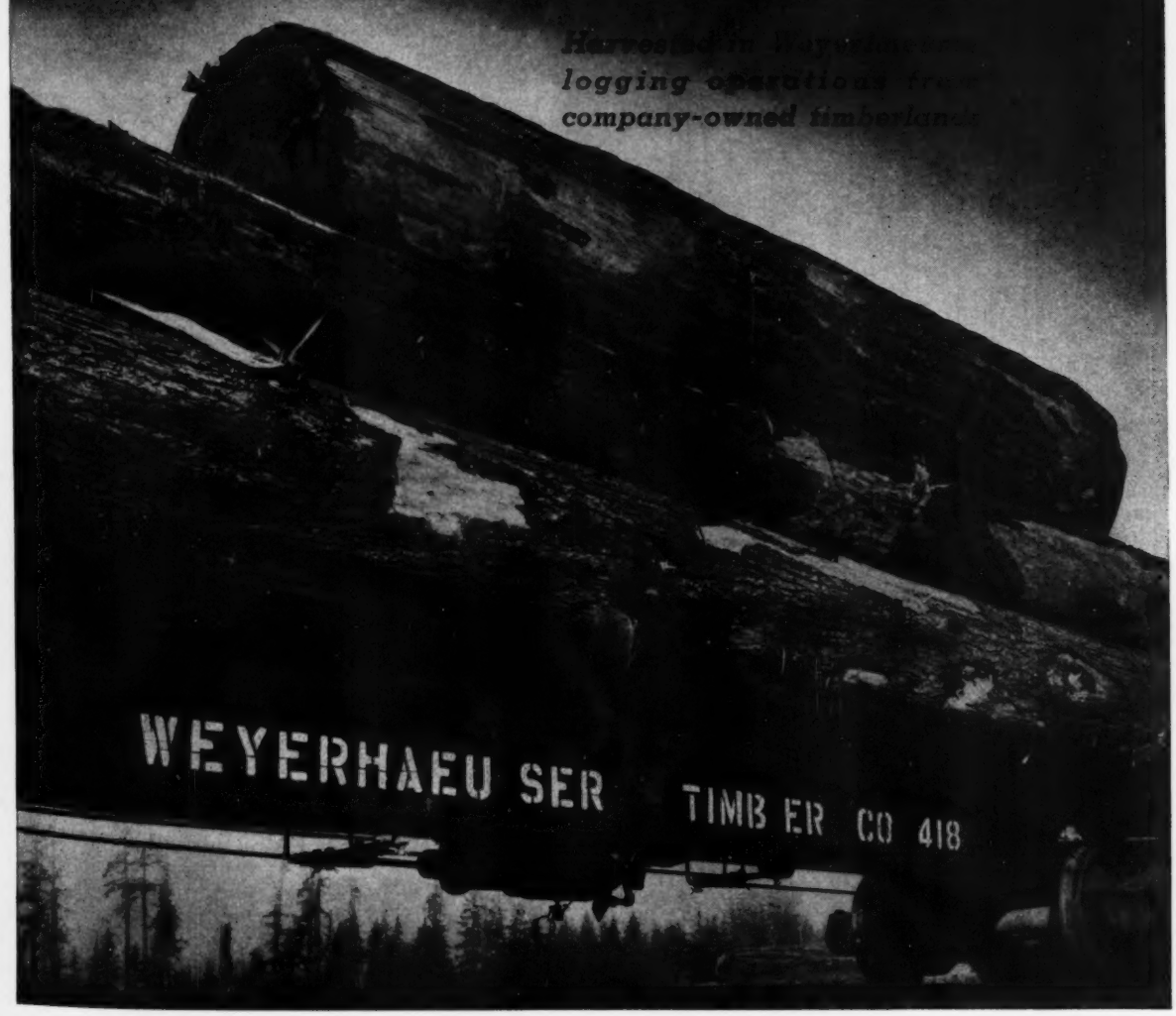
SULPHITE PULP

Produced by the

PULP DIVISION · WEYERHAEUSER TIMBER CO.

is manufactured out of

WEST COAST HEMLOCK



paper industry. However, because alum is the chief floc-forming chemical used in paper manufacture and because more is known regarding its chemistry and use as a source of floc than is known about any other floc-forming chemical, primary consideration will be given in this paper to alum. Comparisons will then be made with other floc-forming compounds.

Effect of Dilution

To show the effect of dilution on floc formation by alum the data are presented in Fig. 1 and 2. Figure 1 is drafted from the work of Theriault and Clark *(1)*. The data indicate that in dilute alum solutions alum floc forms only within narrow limits of pH. The lowest concentration of alum (100 p.p.m.) shown is still considerably above that most frequently used for potable water clarification (17 to 51 p.p.m.) When the range of concentration used in potable water treatment is examined experimentally it is found that (for pure solutions in distilled water) the pH must be controlled within narrow limits at 5.5 in order to effect floc formation. In natural waters the pH at which floc formation from alum takes place may vary slightly from a pH of 5.5 but at whatever pH the floc forms most readily, it will be found that a small variation from this pH will delay or inhibit floc formation completely. The higher concentration (400 p.p.m.) discussed by Theriault and Clark are about the lowest used in paper manufacture. With 400 p.p.m. of alum the pH range over which floc formation occurs in pure water within 10 minutes extends from pH 3.6 to 6.3.

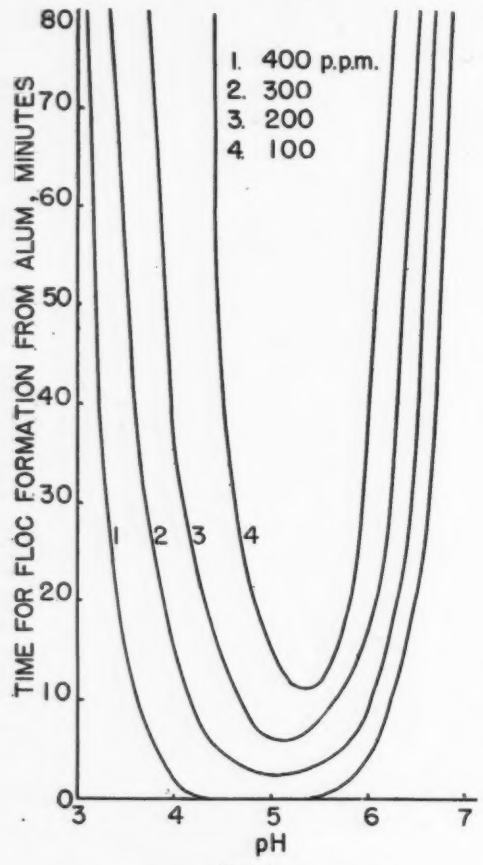


FIG. 1.
Time for Appearance of Alum Floc for Various Concentrations of Alum and at Different pH Values.

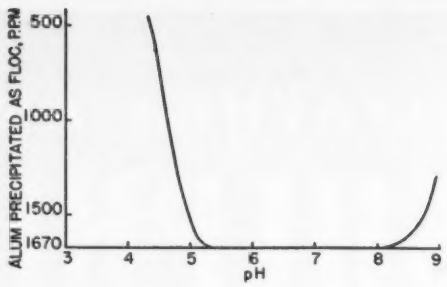


FIG. 2.
Quantity of Alum Rapidly Precipitated from Solutions at Different pH Values to Which 1670 P.P.M. of Alum Have Been Added.

Figure 2 is taken from an earlier article by the author *(2)* and shows the pH range over which partial precipitation and substantially complete precipitation of alum takes place in solutions containing the equivalent of 1670 p.p.m. of filter alum (about the upper limit of alum concentration ordinarily used in paper manufacture). Complete flocculation of alum does not occur (within a few minutes) below a pH of about 5.2, nor above a pH of 8.5. From a pH of 5.2 to 8.5 flocculation is rapid and substantially complete with the concentration of alum above indicated. Below a pH of 5.2 and above a pH of 8.5 there will be considerable "residual alum" remaining in solution, although floc formation will occur outside of the indicated limits for substantially complete precipitation of alum. With lower concentrations of alum the pH range for complete precipitation of alum will narrow until finally (as shown in Fig. 1) at low concentrations the pH must be controlled within narrow limits in order to get the alum to precipitate at all.

May Not Be of Paramount Importance

In paper manufacture the question of the completeness of precipitation of the added alum may not be of paramount importance. For example, it is quite conceivable that an operator may wish to effect the formation of alum floc while retaining the pH of his material at a value below that at which the precipitation of alum is substantially complete. The fact that a part of the alum added remains in solution as "residual alum" may be of little consequence from the standpoint of his operations. In the treatment of potable waters, however, it is desirable that substantially all of the aluminum ion added to the water in the form of alum be subsequently removed as alum floc both from the standpoint of cost and efficiency of floc action and also because of the undesirability, particularly from the psychological standpoint, of permitting any dissolved aluminum salts to remain in the water which is consumed by the public as drinking water.

Effect of Negative Ions

The concentration and valency of the negative ion or ions present in solution has a marked effect upon the formation of floc and the completeness of precipitation of aluminum ion from solution. These facts can perhaps best be demonstrated by comparing the conditions for floc formation and for degree of precipitation for aluminum sulphate (filter alum)

and for aluminum chloride (*see* Miller, *2.*). The data are set forth in Figs. 3 and 4.

Figure 3 shows that aluminum sulphate (filter alum) rapidly precipitates much more completely than does aluminum chloride at the same concentrations of aluminum ion. The sulphate shows most complete precipitation over a rather broad pH range from about 5.5 to 7.5. The chloride on the other hand shows its most complete precipitation over a narrow range centering about a pH of 8.3.

Figure 4 indicates the ease and readiness with which alum and aluminum chloride form visible flocs and the pH ranges over which floc formation takes place within a reasonable time period at the concentrations indicated. Alum shows most rapid floc formation in a fairly narrow zone centering about a pH of 5.5; aluminum chloride shows most rapid floc formation in a much more narrow zone centering about a pH of 8.0. It requires approximately 4 times the quantity by weight of added aluminum chloride as of the sulphate in order to obtain floc formation in approximately the same time under the conditions of the experiment.

Each anion present has its own specific affect on floc formation. Thus, oxalate ion *(2)* permits fairly complete precipitation of aluminum over a narrow range near a pH of 8.8; phthalate over a range somewhat narrower than sulphate and extending from about pH 5.8 to pH 8.8; carbonate over a fairly narrow range of 7.8 to 8.5; chromate over a fairly narrow range of 5.9 to 7.2 but also showing fair floc formation up to a pH of about 9.0; phosphate over a pH range of 4.8 to 7.0. Sodium aluminate in dilute solution when acidified by an acid containing a monovalent negative ion, such as hydrochloric acid, shows a narrow range of floc formation centering about a pH of 8.7. When sulphuric acid (containing a divalent negative ion) is used to acidify the sodium aluminate solution a broader pH range of floc formation is noted extending towards lower pH ranges.

It is obvious therefore that the quality of floc and the conditions for floc formation will vary with the particular aluminum compound made use of and will be affected by the character and concentration of soluble electrolytes already present in the water or which may be added with the aluminum compound. (It may be added parenthetically that the characteristics of flocs formed from aluminum compounds are

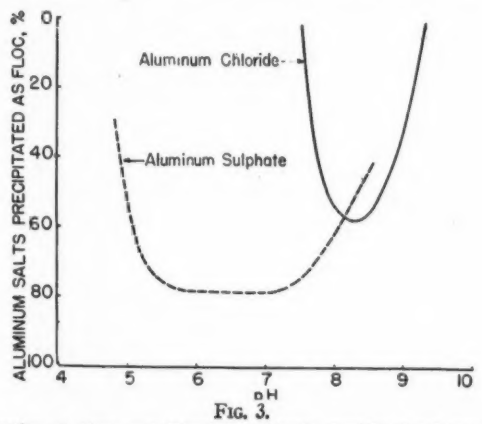


FIG. 3.

Quantity of Alum and Aluminum Chloride Rapidly Precipitated at Different pH Values and for the Concentrations Indicated 0.0015 *N* Aluminum Chloride—120 p.p.m. 0.0015 *N* Aluminum Sulphate—166 p.p.m.

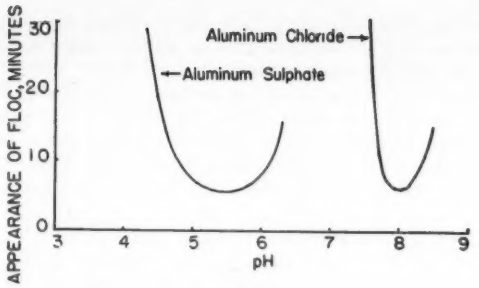


FIG. 4.

Time of Floc Formation at Different pH Values for 80 p.p.m. of Aluminum Sulphate. 318 p.p.m. of Aluminum Chloride.

affected not only by dissolved electrolytes but also by colloidal substances and even by suspended materials present at the time of floc formation.)

Where alum (aluminum sulphate) is used as the source of floc the conditions for floc formation and the floc characteristics will usually be governed primarily by the negative ion simultaneously added, in this case the sulphate ion. The same statement holds true within equal or lesser limits where other acid salts of aluminum, such as aluminum chloride, are utilized. Where sodium aluminate is used as a source of floc, however, the negative ions already present in the water (particularly the polyvalent anions) will have a more pronounced effect in conditioning floc formation.

Effect of Positive Ions

It seems probable that, in the case of sodium aluminate, (where the aluminum forms a part of the negative ion) positive ions present in the water may also have a more pronounced effect on floc formation than where alum or other compounds in which aluminum is the cation are used as a source of floc. This phase of floc formation has recently been investigated by the author, not only in a practical way but particularly by the powerful method of electrometric titration which is especially useful in bringing out both the technical and practical aspects of the subject.

Electrometric Titration

Before the details obtained may be presented, it may be necessary to explain briefly the nature of an electrometric titration *(4)* and its interpretation. In Fig. 5 are given the actual titration curve for potassium alum by an alkali and three hypothetical titration curves for the same compound. In practice an electrometric titration is performed by placing a known quantity of the substance to be titrated (alum) in a container, adding definite small increments of alkali and determining the pH by means of an appropriate electrode after each increment of the titrating reagent has been added.

In Fig. 5 the titration curve is represented on the basis of the half molecule of potassium alum, $KAl(SO_4)_2 \cdot 12H_2O$ rather than representing the alum in the usual way as $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$ merely for the purpose of simplifying the relationship between the aluminum ion and the number of equivalents of alkali added. The hypothetical titration curves have likewise been chosen for simplicity and only the simplest physico-chemical relationships will be discussed. Comparing hypothetical curves A, B, and C we would arrive at the following con-

clusions, assuming that these represented the actual titrations for alum and that a slightly soluble hydrated product was formed in each case:

Curve A: In this case a decided inflection in the titration curve is noted when one equivalent of alkali has been added. The deduction would follow that the slightly soluble product or floc which formed is not $Al(OH)_3 \cdot NH_2O$ but a product of the composition $Al(OH)SO_4 \cdot yH_2O$. In other words a basic salt, not the hydroxide, is being precipitated.

Curve B: In this case the point of inflection would indicate a slightly soluble product of the type $Al_2(OH)_4SO_4 \cdot zH_2O$. That is a basic salt, more basic than in curve A, represents the composition of the hydrated floc. The position of the curve also indicates that product B is less soluble than product A.

Curve C: In this case the inflection occurs where 3 equivalents of alkali have been added indicating that in this case the floc is actually hydrated aluminum oxide or hydroxide, $Al(OH)_3 \cdot wH_2O$. We would likewise expect hypothetical product C to be less soluble than products A or B.

Curve D: Actually it is found that the electrometric titration curve D of alum corresponds to none of these hypothetical titration curves. Inspection of curve D suggests that some sort of basic compound is first precipiated which gradually changes composition as more alkali is added and the pH increases. An actual analytical investigation of the composition of the floc from alum *(3)* indicates that the composition of the floc which first forms and which persists up to the point of inflection is represented by the formula $5\ Al_2O_3 \cdot 3SO_3 \cdot vH_2O$.

Past this point the addition of more alkali causes the replacement of sulphate in the floc by hydroxide so that when 3 or more equivalents of alkali have been added, the composition of the floc is actually that of a highly hydrated $Al(OH)_3$.

In Fig. 6 is presented the electrometric titration of sodium aluminate by hydrochloric acid (this is the reverse of titrating alum by sodium hydroxide). From this figure we note the following facts: the addition of a small amount of acid causes the appearance of floc at a pH of about 9.6. The floc particles are large but not as dense and rapidly settling as those formed from alum in more acid regions. The floc increases first and then begins to decrease as titration proceeds until near a pH of 5.0 the floc disappears as such but an opalescent, colloidal dispersion persists indicating the presence of some slightly soluble compound of aluminum. At a pH of 4.4 the solution becomes perfectly clear. If to the opalescent solution noted above between pH values 5.0 and 4.4, a dilute solution of a soluble sulphate such as sodium sulphate is added, floc formation recurs.

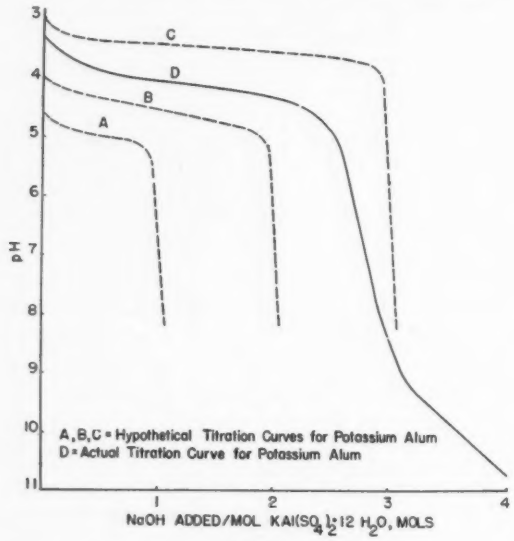


FIG. 5.
Electrometric Titration of Potassium Alum by Sodium Hydroxide and Certain Hypothetical Titration Curves.

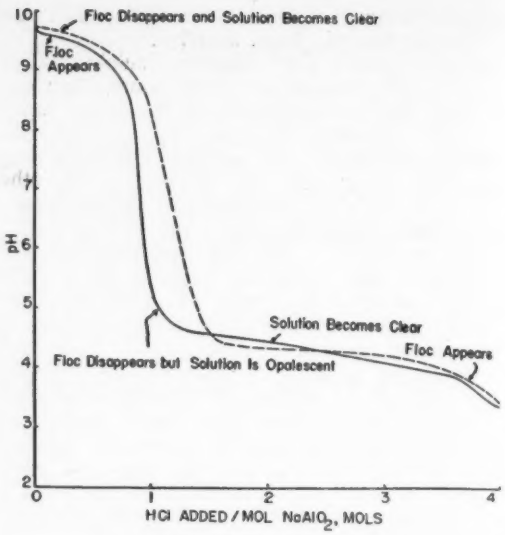


FIG. 6.
—— .410 p.p.m. Sodium Aluminate Solution Titrated by Hydrochloric Acid. - - - 1670 p.p.m. Filter Alum Titrated by Sodium Hydroxide Shown in Reverse for Purposes of Comparison. .005 Molar $NaAlO_2$ = 410 p.p.m. .0025 Molar $Al_2(SO_4)_3 \cdot 18H_2O$ = 1670 p.p.m.

It is noted that the curve shows an inflection very much closer to the ordinate (one mol HCl), which indicates the composition to be hydrated $Al(OH)_3$. It is apparent therefore that the floc has a composition more closely approximating the pure hydrate of alumina than when a floc is formed by titration of alum with alkali under the same pH conditions. It is to be expected therefore that the floc formed from sodium aluminate will possess different properties than the floc formed from alum and one practical difference has been mentioned, namely, that of floc density and settling rate. For comparison the titration curve of alum by an alkali is plotted alongside of that for the titration of sodium aluminate by hydrochloric acid. It will also be noted that alum forms a floc over a broader pH range than does the aluminate under the experimental conditions indicated. With alum no region of colloidal, opalescent solution is noted such as is found with the aluminate. Both alum and aluminate solutions contain the same amount of aluminum per liter and are directly comparable in this respect.

In Fig. 11 data are plotted indicating the specific effect of different anions upon two concentrations of aluminum ion *(2)*. The marked effect of anions upon alum floc formation and apparent solubility is clearly shown by comparing the several curves.

Floc from Sodium Aluminate

Returning now to the subject of the possible effects

which cations may have upon the floc from sodium aluminate, *(5)* the first question which arises is: what cations are usually to be found in fair concentrations in the waters used in paper manufacture? It is those cations whose presence in water results in the effect described as "hardness" which are most commonly found in natural waters—i.e., calcium and magnesium. Considering each one individually, it is well known that the hydroxide of calcium is relatively soluble and would not precipitate as such in normal conditions occuring in paper manufacture. Magnesium hydroxide on the other hand is highly insoluble and capable of forming a floc similar in general properties to alum or aluminate floc. It is necessary therefore to determine the exact conditions under which magnesium hydroxide floc might be expected to appear.

In Fig. 7 it is noted that as magnesium sulphate is titrated by an alkali the pH increases rapidly up to a value of 10.4, for the strength of the magnesium solution selected. An opalescent dispersion then makes its appearance which persists up to a pH of 10.6 (and covering a considerable addition of alkali). At pH 10.6 a hydrated magnesium hydroxide floc appears which persists with further additions of alkali. It is only at fairly high pH values that "magnesia floc" may be expected to appear. In the concentrations of magnesium salts found in waters of reasonable degrees of hardness and in the pH ranges usually found in paper manufacture, magnesium hydroxide floc would not usually make its appearance, although there would be no difficulty in producing a magnesia floc through the use of magnesium salts if this was desired.

In order to determine definitely what affect calcium and magnesium salts present in hard waters might have upon the floc from sodium aluminate, electrometric titrations of sodium aluminate solutions by a calcium salt and by a magnesium salt have been made. The data are plotted in Figs. 8, 9, and 10. Considering first the effect of calcium nitrate to sodium aluminate causes a depression of the pH but no floc formation occurs. The titrated solution after standing for 2 days, shows the presence of a small quantity of crystalline solid phase which qualitative analysis shows to be a calcium aluminate. So far as aluminate floc formation is concerned, calcium ion may be considered of minor importance.

Figures 9 and 10 show that magnesium salts if present in sufficient quantity have a pronounced effect upon aluminate floc formation. The addition of magnesium sulphate to aluminate solution to the extent of 72 p.p.m. of the anhydrous salt causes opalescence to appear and the pH of the solution to drop 0.15 of a pH. Further addition of magnesium sulphate to the extent of 180 p.p.m. (10.6 grains per gallon) causes floc formation at a pH of 9.8. Upon further additions of magnesium sulphate the pH drops slowly

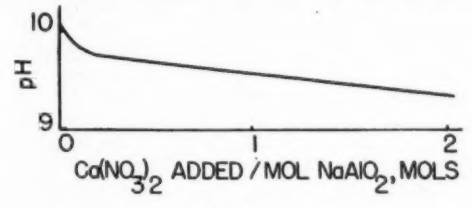


FIG. 8.
410 p.p.m. Sodium Aluminate Solution Titrated by Calcium Nitrate

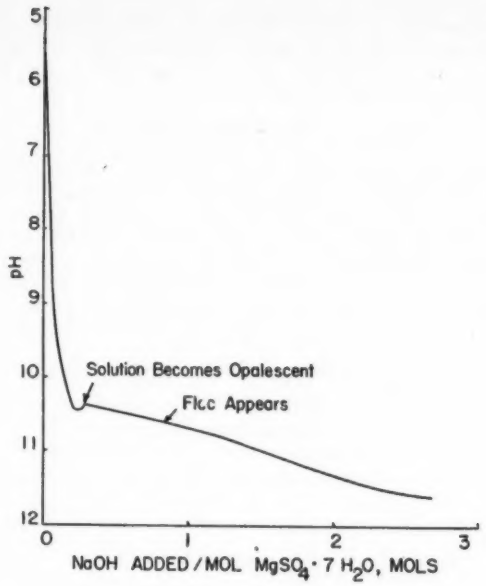


FIG. 7.
1230 p.p.m. Magnesium Sulphate Solution Titrated by Sodium Hydroxide

and increasing amounts of floc are formed. The floc formed when magnesium sulphate is added to aluminate solution is entirely different than the floc formed upon partial acidification of aluminate solution. The magnesium sulphate-sodium aluminate floc is extremely finely divided and settles with exceeding slowness. Thus, after standing 10 minutes it is just barely possible to discern the beginning of formation of a clear layer of liquid above the floc.

The floc formed during the course of the titration was filtered off, washed thoroughly and dried at 220 deg. F. Analysis showed it to possess the exact composition represented by the formula: $3\ MgO \cdot 2Al_2O_3 \cdot 14H_2O$. Whether a hydrated magnesium aluminate of this composition is actually being precipitated during the course of this reaction or whether the particular composition analyzed was accidental is not known. It is clear, however, that magnesium salts do have a pronounced effect upon the characteristics of aluminate floc and that the floc formed contains both alumina and magnesia.

From the practical angle, it would seem that except in waters of exceptional hardness, magnesium salts present would not cause floc formation with aluminate solutions at high pH values. Just what effect magnesium salts (and possibly calcium salts as well) may have upon aluminate floc at lower pH values is now being investigated.

From the results obtained to date it would appear that a magnesia-alumina floc would usually be something to be avoided because of its slow settling characteristics. There may be conditions and uses, how-

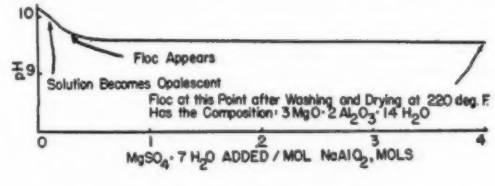


FIG. 9.
410 p.p.m. Sodium Aluminate Solution Titrated by Magnesium Sulphate

ever, where a highly dispersed, slow settling floc may be of value. If such is the case the data presented here indicate one set of conditions for the formation of such a floc.

Effect of Manganese, Iron, etc.

The electrometric titration method of investigation may be applied to other chemical substances used in paper manufacture and likewise to those chemical substances whose presence may prove a disadvantage in such manufacture. Figure 12 presents the electrometric titration of a dilute manganese solution. The results indicate that for the concentration of manganese salt chosen the pH falls rapidly from a pH of 5.5 as alkali is added, to a pH of about 8.9, where floc formation first occurs. The volume of floc increases with the addition of more alkali until substantially all of the manganese in solution has been precipitated. Manganese is often detrimental in paper manufacture and must therefore be removed from the raw water before it can be used in paper manufacture. The data presented in Fig. 12 suggest that where this is done by precipitating and filtering off a manganese floc it will be necessary to maintain a pH above about 9.0 in order for removal of the manganese to occur. This has been substantiated *(6)* by experience in the practice of manganese removal from potable water where it has been found that with a ferric coagulant both iron and manganese are satisfactorily removed by rapid sand filtration when a pH of 9.0 or above is maintained.

The electrometric titration of iron salts with alkalies forms a convenient method of investigating these compounds for floc-forming properties. *(7)* In the case of dilute solutions of ferrous salts (Fig. 13, A) it is found that the addition of small quantities of alkali cause a rapid increase in pH and the appearance of floc at a pH of about 7.6. Upon the addition of one equivalent of alkali a second increase in pH is noted. A curve of this type suggests the formation of a solid phase consisting of basic sulphate which is corroborated by chemical analysis of the solid phase. From the practical viewpoint the formation of ferrous floc is of little importance since this floc is seldom used directly for water conditioning. It is of importance, however, since the rate of oxidation of the ferrous floc to ferric floc (which is made use of in water treatment) is intimately connected with the electrometric titration curve. In the case of ferric salts the electrometric titration yields information of direct value. From the titration curve (Fig. 13) it is clear that the general principles which govern the formation of alum floc are equally applicable in the formation of ferric floc. In the case of the trivalent iron salts floc formation begins at a lower pH than with aluminum salts (the sulphates being used in both cases) thus permitting the extension of the use of ferric sulphate into more acid regions than with alum. A further difference is found in the fact that ferric floc does not redissolve at high pH values as does alum floc, thus permitting its use over much broader ranges of pH. The conclusions drawn from the laboratory investigation have been amply corroborated by subsequent studies *(6, 8, 9, and 13)*.

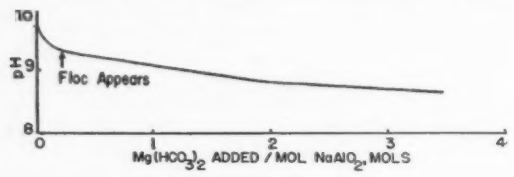


FIG. 10.
410 p.p.m. Sodium Aluminate Solution Titrated by Magnesium Bicarbonate Solution.

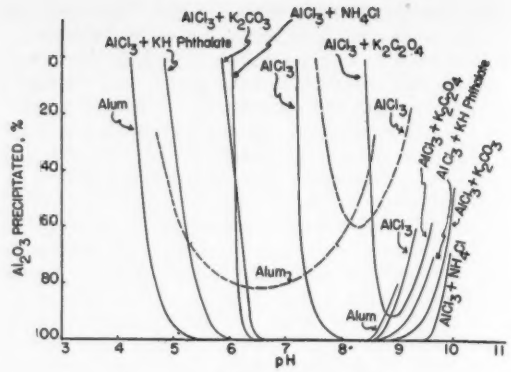


FIG. 11.
Solid Lines—Effect of Different Anions Upon pH Range of Floc Formation and Degree of Precipitation of Aluminum Ion in Solutions 0.005 Molar with Respect to Al. Broken Lines—Solutions 0.0005 Molar with Respect to Al.

Similarly an investigation of chromium sulphate in dilute solutions of chrome alum indicates that chromium floc does not appear until almost 1 equivalent of alkali has been added, during the course of which addition the pH has increased from a value of 3.0 to 5.3. In other respects this floc behaves quite similarly to alum floc except that redispersion does not occur as readily as with alum. Because of its higher cost chromium floc is not made use of in water treatment in paper manufacture. From the electrometric titration curve (Fig. 13, C) and from the discussion in previous paragraphs its possibilities and limitations are at once apparent.

In Fig. 13, D is presented the electrometric titration curve of copper sulphate by an alkali. From the curve it is clear that a small addition of alkali causes a pronounced increase in pH to a value of 5.1 where floc first appears with the concentration of copper salt chosen. With the addition of approximately 1.5 equivalents of alkali a second rapid increase in pH occurs. The titration curve suggests the formation of a basic copper sulphate and this has been checked by analysis of the precipitate. With further additions of alkali the basic salt is converted to hydrated copper hydroxide. The curve also indicates that if it is desired to retain the copper in solution as cupric ion a pH below about 5 must be maintained. Above a pH of approximately 6 most of the cupric ion will have been precipitated. Where copper sulphate is made use of for the control of algæ in potable waters these observations have been corroborated *(10, 11, and 12)*. Where other types of floc are simultaneously present these affect the removal of cupric ion from solution, ferric compounds being particularly effective in this respect even at fairly low pH values. As noted with other metallic salts, the composition of the precipitate is of importance in determining the properties and characteristics of the floc. In the present case the basic copper sulphate floc formed at comparatively low pH values differs from that formed in more alkaline regions. The basic sulphate floc is much more stable towards heat whereas the floc formed at high pH values converts readily to brown copper oxide upon warming the solution containing the floc. These facts are of importance not only where use

is made of copper sulphate in water treatment but also in the use of copper hydrate in agricultural sprays, etc. In water treatment the importance of pH has not always been considered in making use of copper sulphate for the control of microbiological growths.

Conclusion

A new phase of the application of floc formation in the paper industry is now developing in connection with the use of Sveen and Adka save-alls. At the present time the methods of floc formation are largely of the rule of thumb type. Technical information on the subject is accumulating rapidly which will soon lead to a thorough understanding of the subject.

Many, in fact most, soluble metallic compounds will form precipitates with alkalies. Thus aluminum, copper, iron, magnesium, beryllium, titanium, zinc, tin, cadmium, lead, cobalt, nickel, mercury, silver, chromium, and some of the rare earths all tend to form precipitates of the hydroxides in alkaline solution. Because of unsuitable properties, high cost, or because they have never been properly investigated, most of these insoluble hydroxides are not made use of in water treatment. Recently, however, titanium salts have received attention in connection with water treatment *(14)*. In reviewing the literature upon the electrometric titration of soluble metallic compounds with alkalies, it was found that a number of them have been thus investigated. In most cases, however, solutions of such high concentrations have been made use of that the results do not permit of interpretation in terms of the dilute solutions used in water treatment. In other cases limitations of equipment or in the scope of the investigation prevents the direct application of the results to water treatment. In the previous paragraphs, however, several of the more important floc-forming compounds have been discussed in some detail and methods of investigation have been indicated for determining the suitability and limitations of the compounds for water treatment. The usefulness of the electrometric titration

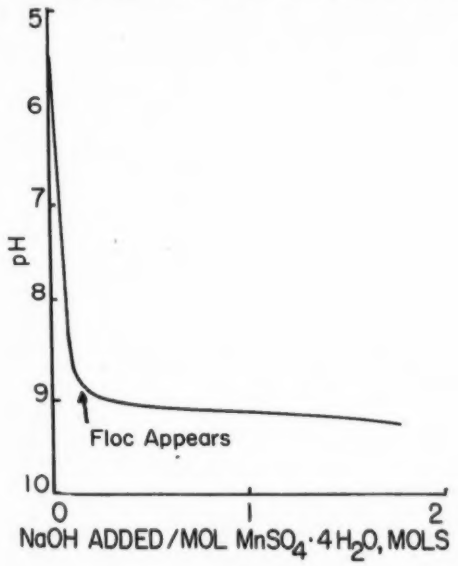


FIG. 12.
1115 p.p.m. Manganese Sulphate Solution Titrated by Sodium Hydroxide.

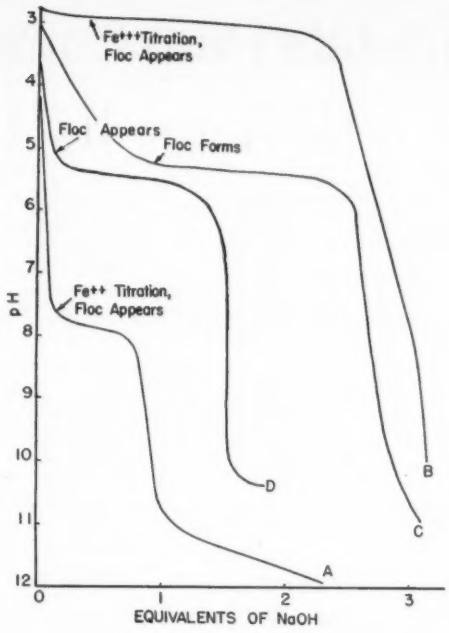


FIG. 13.
Curves A and B—Electrometric Titrations of 0.01 Molar Ferrous Sulphate (2780 p.p.m. $FeSO_4 \cdot 7H_2O$) and of 0.005 Molar Potassium Ferric Sulphate [4550 p.p.m. $K_2SO_4 \cdot Fe_2(SO_4)_3 \cdot 24H_2O$] with Sodium Hydroxide. Curve C—Electrometric Titration of 0.005 Molar Chrome Alum by Sodium Hydroxide [5680 p.p.m. $Cr_2(SO_4)_3 \cdot K_2SO_4 \cdot 24H_2O$]. Curve D—Electrometric Titration of 0.005 Molar Copper Sulphate by Sodium Hydroxide (1250 p.p.m. $CuSO_4 \cdot 5H_2O$).

method has especially been indicated.

It should be pointed out that the development of scientific and technical thought on the subject of floc formation, which has taken place primarily in connection with the art of potable water clarification during the last two decades, is only now beginning to be understood and appreciated in the paper industry. The whole subject is still in the early stages of development; many phases have scarcely been touched by technical investigators. In the next decade the detailed investigation of this field will prove both instructive and useful. The application of chemical coagulants in many phases of pulp and paper manufacture will find widely increased usage.

Literature Cited

(1) Theriault, E. J. and Clark, W. M. "An experimental study of the relation of hydrogen ion concentration to the formation of floc in alum solutions." Public Health Reports, pp. 181-198. Reprint 813 (1923).
(2) Miller, L. B. "A study of the effect of anions upon the properties of alum floc." Public Health Reports, pp. 351-367. Reprint 992 (1925).
(3) Miller, L. B. "On the composition of the precipitate from partially alkalinized alum solutions." Public Health Reports, pp. 1995-2004 Reprint 862 (1923).
(4) Hildebrand, J. H. "Some applications of the hydrogen electrode to analysis, research, and teaching." *J. Am. Chem. Soc.* 35:847 (1913).
(5) Miller, L. B. and Lanz, R. L. "The effect of water hardness on the formation of floc from sodium aluminate." *Paper Trade J.* (Feb. 22, 1940); *Tech. Assoc. Papers* 23:440-442 (June, 1940).
(6) Hopkins, E. S. "Composition and use of ferric hydroxide as a coagulant." *Ind. Eng. Chem.* 21:58 (1929).
(7) Miller, L. B. "Some properties of iron compounds and their relation to water clarification." Public Health Reports, pp. 1413-19. Reprint 1023 (1925).
(8) Hopkins, E. S. and Whitmore, E. R. "Study of the floc produced by chlorinated copperas." *Ind. Eng. Chem.* 22:79 (1930).
(9) Hyde, C. G. "Practical aspects of coagulation with ferric chloride." *J. Am. Water Works Assoc.* 27:631 (1935).
(10) Brockman, C. J. "Adsorption of copper sulphate by aluminum floc." *Ind. Eng. Chem.* 25:1402 (1933).
(11) Brockman, C. J. "Removal of copper sulphate from water by ferric floc." *Ind. Eng. Chem.* 26:924 (1934).
(12) Brockman, C. J. "Removal of copper ions from water by sodium aluminate." *Ind. Eng. Chem.* 27:217 (1935).
(13) Bartow, E., Black, A. P., and Sansbury, W. E. "Formation of floc by ferric coagulants." Am. Soc. Civil Eng. 100:263 (1935).
(14) Upton, W. V. and Buswell, A. M. "Titanium salts in water purification." *Ind. Eng. Chem.* 29:870 (1937).

Sulphite Pulp Committee on Waste Disposal Reviews Its Plans and Activities

Executive representatives of the Sulphite Pulp Manufacturers' Committee on Waste Disposal met recently to review the status of their program, which has just completed its first year. Careful study was given to the organization's several projects, plans were laid for 1941, and a policy was adopted, designed to enlist the support of large non-Wisconsin producers who may care to participate in the program.

After a series of meetings with state representatives in late 1939, the committee was formed by companies producing over ninety per cent of the sulphite pulp produced in Wisconsin. Its purpose is to study collectively and vigorously the problem of disposing of industrial wastes. Over a period of years, individual pulp companies have striven to improve waste conditions. In several instances prodigious efforts have been made and literally millions of dollars have been expended without finding a solution which can be generally applied to the industry. The current program is an acknowledgment of the fact that waste disposal is a subject which is so complicated and at the same time so significant that it requires the combined attention of all involved.

Program in Three Phases

The program, which is projected over a five-year period, may be separated into three distinct phases. The first phase deals with biological methods of waste disposal. In this direction, the committee has already made considerable progress by completing a laboratory study of the trickling filter as a means of handling waste sulphite liquor. A trickling filter may be described roughly as a pile of rock or broken stone, each piece being from two to three inches across, the height and area of the pile depending upon the volume of waste material to be handled. The wastes are sprayed over the top of the pile and allowed to trickle down through the rock. The poluting characteristics of the waste are diminished in this process by bacterial action.

The experiments of the committee have demonstrated that under laboratory conditions this mechanism is fairly effective in removing approximately eighty per cent of the pollution. The next step is to determine whether the method is physically and economically feasible for large scale operation. Plans are being laid for the installation and operation of a pilot plant, which should permit an authoritative conclusion on this approach.

Methane Fermentation

There are other biological methods for waste disposal, and the committee intends to investigate at least one of these, namely, methane fermentation, during 1941. Professor Busswell of the University of Illinois has done some very interesting work with this method of disposal, and the committee has decided that the process has sufficient possibilities to justify exploring its application to waste sulphite liquor.

A second phase of the program relates to the possibility of handling waste liquors by evaporation and incineration. During the past year the committee has made a very careful study of several of these methods in order to estimate their comparative merits and their practicability from economic and technical standpoints. The evidence which has been gathered is quite enlightening. Enormous capital investments would be involved in such systems, and in the absence of tangible data as to operating variables, the committee finds that it is necessary to supplement its current knowledge by a careful study of certain large scale operations that are either under consideration or are currently in operation or in course of construction.

Primary and Secondary Objectives

The primary objective of the study has been to find a suitable means of disposing of the waste liquor. A secondary objective, and one which is economically and technically more ambitious, is the discovery of some satisfactory means of utilizing the wastes. This objective constitutes the third phase of the program. Complete utilization would, of course, automatically solve the problem of disposal and at the same time would have the very desirable result of conserving greater percentages of the raw materials than present methods will allow.

As a first step in the planning of a research program, the committee has assembled a complete bibliography of wast liquors through the offices of the Institute of Paper Chemistry, Appleton, Wis. The bibliography, in book form, includes more than six hundred pages of finely condensed references to previous investigations in this direction. These previous endeavors have been studied carefully for the purpose of eliminating the least promising avenues for new research. On the basis of a critical analysis of these earlier efforts, the Institute of Paper Chemistry is now organizing an ambitious research program, to which the committee will give effective support.

Fine Year Maximum Basis

It is impossible to predict when or if the research program will culminate in a practicable utilization of waste. This is appreciated when one realizes that the field has been diligently studied for over sixty years. Recognizing the urgency of the problem, however, the committee's program is outlined on a five-year maximum basis with the hope that some equitable solution may be uncovered before that period has expired.

While the disposal study was originally organized by companies with pulp mills located within Wisconsin, an arrangement has been made whereby out-of-state manufacturers can cooperate. Already there is one Michigan company which has joined the committee, and others have manifested considerable interest in the program. In view of such participation, the committee has revised its basis of assessment to permit companies of very large production facilities to cooperate upon more reasonable terms. The regular rate of assessment is ten cents per ton of pulp produced. The new plan will apply this rate of assessment to the first one hundred thousand tons of pulp

per year, and after that volume has been accounted for, a maximum contribution of $10,000 per company per year will pertain. It is provided, however, that if the base rate of assessment is raised, the maximum figure will be proportionately raised.

Considerable Progress Made

A review of the first year of the Sulphite Pulp Manufacturers' Committee on Waste Disposal shows that considerable progress has been made on a very difficult problem. Through the efforts of the Institute of Paper Chemistry and a special consultant, considerable data have been collected, laboratory experiments have been sufficiently promising in certain directions to warrant pilot plant operation, and the groundwork has been thoroughly laid for a significant and vigorous research program.

Pacific TAPPI Meets in Tacoma

The Pacific Section of the Technical Association of the Pulp and Paper Industry met at the Winthrop Hotel, Tacoma, Wash., on Tuesday evening, February 4, 1941. W. L. Beuschlein of the University of Washington presented a paper on "Measurement of Vapor Pressures of Sulphurous Acid Solutions." In his paper Prof. Beuschlein reviewed some of the concepts concerning vapor pressure, how such pressure may be measured, and lastly, some of the uses for which vapor pressure can be employed.

He described a laboratory setup for determining pressure measurement of the system $CaO—SO_2—H_2O$ and the method used to determine the vapor pressure of sulphur dioxide. Having the pressure-temperature relation for a solution of known combined and total sulphur dioxide content, the pressure at a given temperature can then be used to fix the pressure-composition curve at the temperature in question.

Such vapor pressure data are useful for the interpretation of the operation of absorption towers in the acid plant of a sulphite pulp mill, said Prof. Beuschlein. He also stated that the working over of dilute acid solutions for the recovery of sulphur dioxide in appreciable concentrations offers a promising field. Further work is being carried on at the University of Washington.

In competition for the Shibley Award, L. E. Stevenson of the Longview Mill, Weyerhaeuser Timber Co., Longview, Wash., presented a paper entitled "The Vortrap as a Means of Dirt Removal from Bleached and Unbleached Pulp." Mr. Stevenson's conclusions were as follows: (1) the Vortrap is a simple, easily operated mechanism, requiring little, if any, maintenance; (2) in consideration of the experiments conducted with a single pass through one Vortrap operating normally on unscreened bleached stock, it may be concluded that the Vortrap is not as efficient in removing inorganic material as are the bleached rifflers; (3) operation of one Vortrap with at least 1.0% of the processed stock "bled-off" and re-Vortrapped, indicates the Vortrap to be more efficient than the rifflers in removing inorganic material; (4) operations on bleached pulp at lower consistencies (0.5%) were slightly better in dirt removal, but possibly do not warrant the additional Vortraps necessary; (5) when the Vortrap is operated at 270 gallons per minute and 1.0% consistency, the dirt removal is not as good as when operated under other conditions, nevertheless, the dirt removal is at least 50% better than that of the riffler; such operations would require less Vortraps than originally planned; (6) consideration of the experiments conducted on unbleached screened pulp indicates the Vortrap to be relatively inefficient when compared to the rifflers and screens.

Captain F. B. Lee, Ordnance Department Reserve, U. S. Army, who is advisor on occupational deferments of State Selective Service Staff, spoke on the subject and explained to those present the objects of the new draft law and how deferment can be arranged. Captain Lee's information was very well received and numerous questions were presented from the floor.

Eighty-one attended the meeting. Among those present were: Gerald F. Alcorn, Niles N. Anderson, A. J. Bailey, J. H. Baker, Walter R. Baumann, C. B. Baxter, R. B. Beal, W. L. Beuschlein, J. R. Blair, Carl E. Braun, Robert E. Brown, H. J. Browne, A. M. Buck, A. M. Cadigan, G. H. Cady, Claude Callaghan, R. S. Carey, Kenneth Chapman, R. E. Chase, R. D. Colburn, N. W. Coster, J. V. B. Cox, John Doering, R. E. Drane, N. O. Galteland, Irving R. Gard, A. S. Gerry, Wm. R. Gibson, Alfred Graef, Harold G. Griep, A. D. Hawley, W. D. Hodges, C. F. Holcomb, A. H. Hooker, Jr., Lester M. Johnson, W. A. Kelly, Robert M. Kuhn, Fairman B. Lee, Jesse R. Lewis, A. H. Lundberg, A. C. McCorry, C. R. McCully, Leonard McMaster, Jack Martin, Murl Miller, T. E. Moffitt, Fred Nicholson, S. Norman, Max R. Oberdorfer, F. A. Olmsted, Edwin L. Olmsted, Adolf Orup, G. V. Palmrose, Frederic M. Pape, William Pittam, Paul Pittenger, E. W. Purdue, A. S. Quinn, H. Radford Russell, A. P. Ratliff, Jr., H. H. Richmond, Oliver E. Ronken, A. J. Rosengarth, James Ruck, Walter A. Salmonson, Harlan Scott, F. C. Shaneman, Brian L. Shera, Robert E. Simkins, W. A. Simpson, M. E. Sorte, L. E. Stevenson, Allan G. Strang, H. V. Tartar, V. L. Tipka, Harold F. Warren, L. H. Wear, C. Kelly Wells, L. A. Wendt, Jack Wilcox and Edward P. Wood.

L. F. Supple Goes with Reynolds Metal

L. F. Supple, formerly president of the Springfield Glazed Paper Company, of Springfield, Mass., has joined the Reynolds Metals Company as head of the Unifoil Division. Mr. Supple for thirteen years was affiliated with Whiting, Patterson & Co. of Philadelphia, paper jobbers, for a time being general manager and treasurer of that company. For a number of years Mr. Supple has been prominent in the converting field and in the handling of fancy and decorative papers for packaging. He is widely acquainted in the glazed and fancy paper business, and is well known in the trade for his activities in the National Paper Trade Association. Mr. Supple will make his headquarters at Richmond and New York.

Writing Paper Manufacturers Association Celebrates Its 80th Anniversary

The eightieth anniversary of the Writing Paper Manufacturers Association was celebrated by a dinner held by the association on the evening of February 18, 1941, at the St. Regis Hotel, New York.

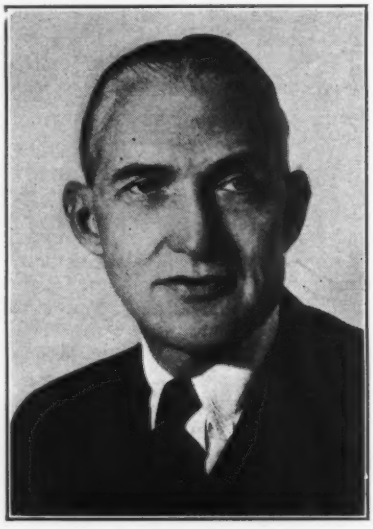
The original constitution, on display at the dinner, was adopted in Pittsfield, Mass., February 13, 1861. The first president was Harrison Garfield, of whom little is now known other than he filled that office in 1861. Of the twenty-one original companies who signed the first constitution three concerns, the Carew Manufacturing Company, the Parsons Paper Company, and the Southworth Company, are members of the association today.

The records of the Writing Paper Manufacturers Association prior to the establishment of headquarters with a paid secretary and staff are meagre. In the list of past presidents between the founding of the association and the turn of the century, information is incomplete. There is evidence, however, that the association functioned rather intermittently during that early period rather than continuously.

William Whiting Chairman in 1875

In the year 1884, the list of members is nearly complete. About this time the American Paper Manufacturers Association was organized and the Writing Paper Manufacturers Association became a division of it. In the annals of this trade organization the first communication was signed by a Mr. William Whiting, as chairman, on November 17, 1875. The historian of the association has gleaned from old records that this William Whiting was born a century ago. He had a son, William, who was Secretary of Commerce in the cabinet of President Coolidge and was the grandfather of the present William, Edward and Fairchild Whiting who operate the business today.

A part of Mr. Whiting's communication which will be read with interest by many paper manufacturers today refers to curtailment of production and is as follows: "The manufacturers of this class of goods, appreciating the condition of trade in their line, and the difficulty there is, on a declining market, in obtaining a profit for either manufacturer of jobber, have this day held a meeting which was quite largely attended. They determined, if they could secure the consent of all the manufacturers of all classes of these goods, to materially curtail the production for the year 1876, and to meet the enhanced cost of the goods by the short production, to advance prices some ten per cent, the latter to go into effect at once. The project is to shut the mills down entirely from December 15 to January 17, and in January to again meet and determine whether to start up on half-time, or on full time, and again at a later day shut down."



A. C. Gilbert, President

M. C. Dobrow, Secretary

Records of the past reveal that references to this curtailment of production became more or less general in November or December of each year, long before the Sherman Act came into existence. Unfortunately, nothing is available to indicate how successful this production curtailment was, but apparently paper manufacturers then as now had various difficulties of one kind or another.

Book Mills Cooperate with Writing Mills

In the early 1880's, it is revealed that when some of these writing paper mills shut down, they found that manufacturers of other grades of book paper continued to produce the paper which they were curtailing, and thus in a communication dated November 17, 1884, is found the first evidence of the fine spirit of cooperation between the writing and book divisions of the then American Paper Manufacturers Association. This communication is as follows: "As the manufacturers named below have signed the

agreement or signified their willingness to shorten production, your committee now requests you to shut down your machines and engines the last full weeks of the months of November, December and January."

Following the above announcement to the industry was included a list of thirty-five writing paper mills, of which eighteen are currently members of the association under the same corporate names. The communication then goes on to say that, "The book mills in Holyoke and some outside of Holyoke, have agreed not to make any engine sized writing or envelope papers during the shut-down of the tub sized writing mills."

At this point Clarence Clough, of the New York and Pennsylvania Company, who is chairman of the Book Paper Manufacturers Association, was asked to rise and take a bow. Mr. Clough then received the compliment that, "The cooperation between these two divisions has been of mutual benefit, and we sincerely trust that it will continue in the years to come as it has in the past."

Tribute Paid to Older Men in Industry

The older men in the association were honored briefly and appropriately as deans in the paper industry. "Mr. Horace Moses is a dean by virtue of the fact that he is the oldest member of the association. He is now in his 79th year. He has been in the paper business 58 years, and I don't have to tell his competitors that he is modern, progressive and forward looking in the production and merchandising policies of his splendid organization."

"Mr. Frank McElwain is also a dean of this industry by virtue of the fact that he has served the industry for a longer time than anyone in it today. Mr. McElwain came into the paper industry April 1, 1881, 60 years ago six weeks hence. His contributions to his companies and to this industry are varied and well known. I would like to mention just two—Mr. McElwain was a pioneer in the art of practical and scientific paper making long before the days when our scientific schools began to supply us with those brilliant young minds that are gradually turning this industry from an art to a science. Probably Mr. McElwain's greatest contribution to this industry is the development of the standard substance numbers for writing papers. It would be impossible to calculate the value of this contribution to the manufacturers, distributors and the general public, which he developed and promulgated through the medium of this association."

A tribute was also paid to another prominent paper man—H. F. Harrison, of the West Virginia Pulp and Paper Company. "We have with us too another bright young gentleman who has been in the paper business for a long time—Mr. Frank Harrison of the West Virginia Pulp and Paper Company. The West Virginia Pulp and Paper Company is, as you know, the largest book paper concern in the world. They are also substantial producers of writing paper and members of this association. Mr. Frank Harrison, vice-president and director of the company, on the first day of this month completed fifty years of service with that company."

Crane & Company Oldest Member

The oldest member of the association is Crane & Company which has had a continuous existence since 1801 as a manufacturer of writing paper. Winthrop Crane, who represents the fourth generation of the Crane family as paper makers was asked to rise, and the following tribute was paid to Mr. Crane's father. "I have distinct recollection of Senator Crane, Winthrop's father. His deep interest and influence in association activities in the early days of the century were always constructive and unselfish. His interest and influence in our deliberations was always in evidence despite his many duties and active interest in affairs of state as Governor of the State of Massachusetts, United States Senator, patriot and leader of the G.O.P."

In paying tribute to William and Dan Beckett, sons of Thomas Beckett, and his nephew, Guy Beckett, all of whom were present, the speaker said: "Another mill that has a long and ancient history is the Beckett Paper Company, a pioneer paper mill in the West, founded in 1848. Many of us have a distinct and fond recollection of our pleasant association with Thomas A. Beckett. Guy Beckett was president of the Cover Paper Manufacturers Association for several years. As you know, in 1938 that association voted to become a part of the Writing Paper Manufacturers Association and Mr. Beckett has been chairman of the cover paper group."

Among those present were two who have retired from the industry and who were introduced to the younger guests present. They were Alfred Leeds and Albert Smith. The guest speaker was General Hugh S. Johnson who spoke on the general topic of "The Transition From Peace to War Time Economy."

TAPPI Meets at Appleton

The Lake States Section of the Technical Association of the Pulp and Paper Industry met at the Conway Hotel, Appleton, Wis., on Tuesday evening, February 11th. Martin L. Downs of the Thilmay Pulp and Paper Company presided as chairman.

W. H. Swanson, President of TAPPI, discussed the development of the Association, its services to members and its present program.

A group of short papers were presented by students and members of the staff of the Institute of Paper Chemistry. Cyril Delavanti, Jr., and J. A. Van den Akker talked on "A Further Study of Friction Between Solid Surfaces and Paper Stock Suspensions." William H. Aiken and Otto Kress on "The Possibility of Using Gypsum to Replace Sodium Sulphate in Part of the Kraft Recovery Process" and Joseph Atchison and S. D. Wells on "The Production of Pulp from the Fibrous Elements of Sugar Cane Bagasse."

Those present included: Joseph Ackerman, D. H. Beisel, H. W. Bialkowsky, C. J. Christiansen, H. A. Chuse, Art Coffin, Carleton M. Cook, R. C. Crain, Dave DeZurik, Phil Dixson, G. F. Enderlein, L. E. Fitzgerald, Frank R. Forrest, A. T. Gardner, H. B. Giese, John H. Graff, J. W. Grimes, William S. Grimes, K. D. Hay, E. G. Heberlein, C. E. Johnson, A. G. Kernin, M. Kershasky, G. A. Koebke, Charles M. Koon, C. Krake, Stephen Kukolich, J. O. Logan, N. L. Malcove, L. A. Moss, S. A. Parsons, P. A. Paulson, L. B. Penhallow, Wm. J. Plank, D. C. Porter, Joseph K. Post, T. R. Probst, Henry Reeves, Jr., J. B. Roskaus, C. A. Schroeder, G. H. Sheets, Allen H. Shuerer, A. I. Sippola, C. W. Steele, Robert M. Stuart, W. H. Swanson, J. A. Van den Akker, R. W. Van Kirk, E. J. Vickman, E. H. Voightman, H. L. Voss, R. S. Watson, S. D. Wells, H. Wenberg, J. C. Wollwage and M. A. Yavorsky.

National Paper Trade Association Meets

The National Paper Trade Association of the United States held its Thirty-eighth annual convention at the Waldorf-Astoria Hotel, New York, February 17-20 inclusive. It was largely attended with a large number of exhibits arranged on the eighth and ninth floors.

At the annual meeting on Thursday morning all officers were reelected as follows: president, P. W. Lesh, C. P. Lesh Paper Company, Indianapolis, Ind.; vice-president in charge of Fine Paper Division, J. H. Brewer, Storrs & Bement Company, Boston, Mass.; vice-president in charge of Wrapping Paper Division, C. E. Roach, Capital City Paper Company, Springfield, Mass.; treasurer, C. W. Vernon, Vernon Bros. & Company, New York; executive secretary, A. H. Chamberlain, 220 East 42nd street, New York.

John L. Riegel, president, American Paper and Pulp Association addressed the association on Monday. At the opening session the scheduled speakers included an address by the Hon. Joseph E. Casey, Member of Congress from Massachusetts, on the subject of "Democracy in a Crisis." Another scheduled speaker at this session was Dr. Theodore N. Beckman, Professor of Business Organization, Ohio State University, on the subject of "The Role of Paper Distributors in National Defense."

On Wednesday Arthur H. Motley, vice-president of the Crowell-Collier Publishing Company, New York, spoke on salesmanship, and Hamilton Wood, president of the Commonwealth Press, Worcester, Mass., spoke on paper and the printer.

Address of J. K. Javits

In the field of production Mr. Javits said the prime consideration was "adequacy of supply." He pointed out that there is already some discussion in the paper industry of possible shortage in some chemical pulps, one of the raw materials for making certain types of paper, and that wood pulp is being experimented with for utilization in explosives. If shortages should occur, said Mr. Javits, they can be met, first, through "the substitution of other materials for those in which there is a shortage; and second, through the most economical utilization of the materials in which shortages exist and of the substitutes developed for them." In connection with the substitution of products he called upon the paper industry for cooperative and adequately financed research. He pointed out that research has been confined to the larger concerns, whereas it would be of even greater assistance to the smaller concerns, and that the smaller concerns could not engage in research except cooperatively through trade associations. He therefore urged that the trade associations in the paper industry undertake a research program at this juncture.

PERRY W. LESH, President

A. H. CHAMBERLAIN, Secretary

In respect of the economic utilization of materials and their substitutes, Mr. Javits called for a program of standardization and simplification of lines, grades, colors, sizes and weights. In this respect he said: "that a perfectly golden opportunity is being presented to you by the existing emergency." He called for such standardization and simplification as being of the greatest permanent benefit to the seller as well as to the buyer of paper because it would reduce the unnecessary costs of carrying much useless inventory, and of providing warehousing space for such inventory. He pointed out, for instance, that there was a range of basic market prices for a series of different grades of a single type of printing paper showing a difference in price for each grade equivalent to less than one-fifth of a cent per lb. He said that the Graphic Arts Industry requires "no such minute distinctions of quailty," and that the ultimate result is an unnecessary burden on the paper merchant, the printer and the buying public.

Standardization May Be Required

Mr. Javits claimed that a program of standardization and simplification would require definite specifications of quality and would therefore make for knowledge on the part of the buyer of what he was buying, and for open competition between competing

EXTRA The New

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When slime forming organisms invade paper mills, there's no tramp, tramp, tramp of marching feet—these fifth column heterophytes pursue their subversive activities unseen, unnoticed—until accumulations of slime cause severe production losses!

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Send today for your copy of the new W&T reprint "Microbiological Control in Pulp and Paper Manufacture." It tells how you can combat the invasion of heterophytes by preparedness!

*Heterophyte: Any dependent organism which derives its sustenance from dead organic matter, or at the expense of some other living organism . . . as "parasite" which means literally, "eating at the table of another," or, as "slime forming micro-organisms" — uninvited guests which "eat at the table of the paper manufacturer."

P30

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sellers. He pointed out, too, that such a program would result in economy in transportation facilities now employed to carry many unnecessary items.

In dealing with other problems raised by national defense, Mr. Javits stated that the diversion of some existing manufacturing plant capacity now used for the production of pulp or paper may well be required. In such an event he urged that productions be concentrated in certain strategically located plants by cooperation between different manufacturers, and that such arrangements could most effectively be made through trade associations.

Mr. Javits made a strong plea for the participation by small business enterprises in the national defense effort, and pointed out that small business had to give in return assurance of adequate management controls "to guarantee quality and delivery." This, he said, could be accomplished through centralized technical management obtained by trade associations on a cooperative basis.

In the likely event of a strain on the transportation system, Mr. Javits urged that servicing of customers could be effected through the warehouses of competitors most conveniently located, and that this could be arranged without sacrifice of customer relations through the facilities of trade associations. He pointed out that this would go a long way toward easing transportation difficulties.

The Question of Prices

On the question of prices, Mr. Javits said it was the duty of the trade associations to avoid "an inflationary spiral in the prices of civilian necessities, and price increases which will tend to attract materials and productive facilities away from military and into civilian production." In this respect, he urged that, increases "in profit margins, either on an absolute basis, or on a percentage of volume basis," be avoided where a fair return was already being earned. In this way, he said, inflation of the money system could be avoided. He also pointed out that the price question ought to be considered in relation to other prices, and the trade association ought to guard against run-away prices in any field, which would tend to dislocate price relationships generally.

Mr. Javits pointed out that the solution of these problems requires adequate knowledge of the facts and that this meant major statistical controls. "It is essential," he said, "that we know the extent of raw material stocks, actual productive capacity and the rate of current demand as compared with the rate of normal demand in any industry, as well as costs of production, relative operating efficiencies and rates of profit." He called for information on available labor power and the extent to which it is being utilized, and for research on what constituted reasonable returns on productive facilities engaged in particular industries. Mr. Javits therefore suggested that the furnishing of business statistics should be compulsory if necessary, that trade associations should be the agencies through which they should be gathered, and that a United States Office of Statistical Control be created to coordinate and integrate the mass of information on the American economy now received and considered by so many diverse sources.

Mr. Javits concluded his address with a plea for for the assumption of the responsibilities by industry for the economic security of individuals and for adequate military production ahead of considerations either of immediate profit or of ultimate effect upon individual competitive status.

Central Ohio Elects Officers

At the annual meeting of the stockholders and directors of the Central Ohio Paper Company, Columbus, Ohio, O. A. Miller was renamed as chairman and treasurer of the board, and his son, Albert M. Miller, was reelected as president and assistant treasurer of the company, it was announced by officials of the company.

Other officers renamed were F. E. Miller, vice president; R. W. Miller, vice president and secretary, and J. F. Page, vice president, assistant secretary and sales-manager. The five officers composed the company's board of directors.

Other officers of the company include R. C. Williams, vice president in charge of manufacturing operations; W. H. Bancroft, vice president in charge of the Dayton division; William Jones, vice president in charge of the Cleveland division; C. E. Munz, vice president in charge of the Detroit division; J. L. Davies, vice president in charge of the Indianapolis division; W. D. Lamb, vice president in charge of the Pittsburgh division, and A. C. Gall, vice president of the Toledo division.

Other executives include A. F. Miller, vice president and assistant sales manager; J. M. Blakey, vice president and manager of the wrapping paper department; H. S. Bronson, vice president and manager of the stationery department, and Russell I. Dennis, manager of the roofing and building paper department.

Hooker Co. Elects Officers

The Hooker Electrochemical Company announces the election, at a regular meeting of the board of directors, January 20, of the following officers: H. M. Hooker, president; E. R. Bartlett, executive vice president; R. L. Murray, vice president in charge of development; R. W. Hooker, vice president and sales manager; L. A. Ward, secretary and assistant treasurer; J. F. Bartlett, treasurer and assistant secretary; W. A. Perrin, assistant treasurer; D. A. Riordan, assistant treasurer.

The company also announces the appointments of: B. Klaussen, works manager, Niagara plant; A. H. Hooker, Jr., western sales manager, Tacoma plant; J. A. Flynn, works manager, Tacoma plant; Dunbar Meek, purchasing agent; H. W. Hooker, Jr., assistant purchasing agent; G. F. Rugar, in charge of sales promotion; T. L. B. Lyster, continues as chief engineer.

Claim to Word Cellophane Denied

RICHMOND, Va., February 17, 1941—U. S. District Court Judge Robert N. Pollard has denied the claim of the duPont company to the exclusive use of the word "cellophane."

The duPont company sought to enjoin the Sylvania Industrial Corporation from use of the term for a cellulose material it manufactures at Fredericksburg, Va.

Judge Pollard held in effect that "cellophane" is a generic term and that no other word or combination of words could adequately describe the product.

Printers Paper Supply Co. Entertains

A tribute to the growth of small enterprise saw its fruition at the recent Open House Celebration of Printers Paper Supply Company in Pittsburgh, Pa. Braving the city's worst weather of the winter, 218 customers and well-wishers attended the house warming on Monday and Tuesday evenings, January 28 and 29 at the company's new, modern warehouse at 1251-1261 Reedsdale street. A novel bar-room with a fourteen-foot full fledged bar, bartender-and-all, was set up in the Pittsburgh paper house's spacious shipping section.

Pleasantly surprised were the merrymakers at Printers Paper Supply's new 25,000 feet of warehouse situated on one floor. They saw carloads of fine papers uniformly placed by grades in city-block length aisles. Adequate shelving carried large quantities of open stock. The new shipping department measuring 30 x 50 feet is a treat in itself. Wrapping tables, against a windowed-wall, run the complete length of the shipping room. The Seybold cutter is strategically placed at one end of the room with sufficient space about the cutter to handle a number of skids of stock at one time. Fluorescent lighting and other last-word touches seem to spell efficiency in the handling of customers' orders.

Joseph M. Katz, who started the business in 1936, recounts the difficulties the company had in its first couple of years when it maintained a small loft space of less than one-thousand feet of space. Hampered by insufficient capital and the reluctance of mills to cooperate with the newcomer, the first two years were indeed discouraging.

Mr. Katz stated, "In 1937 when paper production had risen out of depression depths into sudden prosperity, when machine production was sold out for months ahead, we were in the position of a buyer begging to be sold. In short, we were frozen out. We saw in our potential suppliers a fealty, a loyalty to their regular customers, whom, they felt, should be supplied and serviced first. Out of this experience we desired to associate ourselves with mills who would show us the same loyalty that our would-be suppliers extended to their customers. During the past few years we have affiliated our merchandising program with some of the finest paper mills in the industry. We like to believe that our growth during our first five years has in a measure owed much to our mill connections."

Mr. Katz extends an invitation to all paper men, when in Pittsburgh, to visit the firm's new offices and warehouse.

New Industrial Fluorescent Fixtures

A new open-end twin lamp luminaire utilizing the recently announced 100 watt, 60-inch, white or daylight fluorescent lamps, and designed especially for general high level illumination in industrial plants, is announced by the Westinghouse Electric and Manufacturing Company. This new 2-FP-100 luminaire meets RLM specifications; is applicable to installations requiring high mounting heights; and is available for operation on 110-125, 199-216, and 220-250 volts, 60 cycle AC.

Units consist of a hood, reflector, lamp holders, starting device, and ballast equipment. A fabricated sheet steel hood with all auxiliary equipment mounted and wired as part of the whole assembly, provides easy access for line connections during installation. Two reflector types provide a choice between totally direct and diffused, or semi-direct illumination. The direct type throws all the light downward, whereas the diffuser unit allows a minimum of approximately 2½% upward light to pass through apertures above each lamp reducing brightness contrast between the ceiling and the lighted area. Both reflectors are 18 gauge porcelain enameled steel, and provide a shielding angle of 14 degrees below the horizontal when viewed normal to the lamps.

Two-lamp ballast provides the high power factor of over 90%, minimizes cyclic flicker, and assures satisfactory lamp performance.

Standard units are arranged for rigid, flexible conduit, or chain suspension mountings; are shipped completely wired, and have a smooth silver-gray baked enamel finish. Further information may be obtained by writing Westinghouse Electric and Manufacturing Company, Lighting Division, Cleveland, Ohio, Edgewater Park.

Timber Royalties are Increased

VANCOUVER, B. C., February 15, 1941—Timber royalties for British Columbia have been increased in the Vancouver and Prince Rupert forests districts. An amendment to the Provincial Forestry Act revising the changes was passed at the last session of the B. C. Legislature and has now gone into effect.

The four grades of saw logs are modified in Nos. 1 and 2, there being no alteration with regard to No. 3 and ungraded qualities.

In No. 1 the current rate of $1.35 is raised to $2 and No. 2's which have also stood at $1.35 will move up to $1.50. These figures apply to the Vancouver forest district, which includes Vancouver Island and half the Coast line. In the northern half of the B. C. Coast within the Prince Rupert area, the increase in Nos. 1 and 2 is much less than in the Vancouver forest district, where the bulk of the cut takes place.

The effect on Vancouver Island is less than in many other sections, owing to the fact that the special conditions of the Esquimalt and Nanaimo railway land grant create exceptional rules. Outside the land grant, however, there are important forest areas on the north-east Coast, on the West Coast around Nootka, the Alberni Canal, and the San Juan estuary where these new schedules will operate.

A new class of small timber will be charged royalty under classification of mine timbers. This will include timber with tops of four inches and under.

Rag Rates to Canada

Some progress is being made by the National Association of Waste Material Dealers, Inc., on its request for a lower basis of rates on rags into Canada. According to information just received by the association, the General Freight Agent, Trunk Line Association, at a meeting held early in February, recommended the establishment of Class 27½ rating with carload minimum weight of 30,000 pounds subject to Rule 34, applicable from Trunk Line and New England territories to Eastern Canada.

It is still necessary for the Canadian Freight Association and the New England Freight Association to concur in this proposal before it can become effective but the Association is hopeful that these concurrences will shortly be obtained.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 19, 1941—Government Printing Office has received the following bids for 2,910 pounds (15,000 sheets) of 32½ x 32½ buff sulphite index paper; Paper Corporation of U. S., 6.9 cents; Mudge Paper Company, 7.6 cents; Virginia Paper Company, 8 cents; Old Dominion Paper Company, 7.9 cents; and R. P. Andrews Paper Company, 7.74 cents.

For 5,032 sheets of 24 x 42 white vellum tracing paper; Keuffel & Esser Company, $86.00 per M sheets; Charles W. Speidel & Company, Inc., $35.75 less 2 per cent; J. H. Weil & Company, Inc., $31.00; Frederick Post Company, $72.70; American Blue Print Company, $31.00 and $34.50; and Modern Blue Print Company, $31.00 and $34.50; and Modern Blue Print Company, $80.00.

R. P. Andrews Paper Company has been awarded the contract for furnishing the Printing Office with 1,890 sheets of 100 per cent rag, 21 x 32 white bond paper at $35.70 per M sheets.

For 216,290 pounds of white M.F. book paper in 38 inch rolls; R. P. Andrews Paper Company, 4.95 cents; Barton, Duer & Koch Paper Company, 5.30 cents; Stanford Paper Company, 5.85 cents; Whitaker Paper Company, 5.73 cents; Mudge Paper Company, 5.39 cents; Marquette Paper Company, 5.24 cents; Paper Corp. of U. S., 5.22 cents; and Frank Parsons Paper Company, 5 cents.

For 45,600 pounds (600,000 sheets) of 22¼ x 32¼ M.F. book paper; Whitaker Paper Company, 5.63 cents; Mudge Paper Company, 5.24 cents; Old Dominion Paper Company, 5.619 cents; R. P. Andrews Paper Company, 4.88 cents; Barton, Duer & Koch Paper Company, 5.07 cents; Stanford Paper Company, 5.18 cents; Marquette Paper Company, 4.98 cents; Paper Corp. of U. S., 4.87 cents; John F. Post, Inc., 5.64 cents; and Perkins-Goodwin Comwin Company, 5.03 cents.

For 40,000 pounds of 50% rag, No. 32 white bond paper; Aetna Paper Company, 9.34 cents; R. P. Andrews Paper Company, 9.77 cents; Barton, Duer & Koch Paper Company, 11.30 cents; Mudge Paper Company, 10.94 cents; Paper Corporation of U. S. 10.95 cents; Old Dominion Paper Company, 9.947 cents; Butler Paper Company, 9.59 cents; and Cauthorne Paper Company, 10.98 cents.

For 10,000 sheets of 24 x 36 brown cloth lined paper; Mudge Paper Company, $113.22 per M sheets; Middlesex Products Corp., $113.00; Barton, Duer & Koch Paper Company, $112.82; Whitaker Paper Company, $112.84; and Nashua Gummed & Coated Paper Company, $101.25 less 2%.

TAPPI Discuss Vocational Training

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry met at the Park-American Hotel, Kalamazoo, Mich. on Thursday, February 6. W. K. Kidder of the Bryant Paper Company presided as chairman.

W. L. Cassiday and George Dean of the Michigan State Department of Vocational Education outlined the details of the training work being carried on for the two mills in Port Huron, Mich. and for other industries elsewhere in the State. About 100 men are enrolled at Port Huron which is conducted by the public school system and supervised by the State Board which contributes 75 per cent of the cost. The remainder of the cost is met by the local educational board and the mills. At Port Huron this averages eight dollars per year per man.

In this course the workers are taught more about their jobs; made acquainted with jobs they aspire to, shown the interrelation of their job to the entire mill, and given an outline of their industry in general. The course covers a period of two years, 30 weeks per year and 27 subjects. "Avoid lecturing" said Mr. Cassiday, "and any resemblance of a schoolroom atmosphere. We hold our classes in rooms at the Y.M.C.A. There are no examinations except when our men ask for a true-false quiz." The program has improved relations between employees and employers and between mills.

H. M. Olson of the Ohio Salt Company presented a paper on "Treatment of Process Water for Papermaking".

Following this paper the sound movie "Packaging Marches On" was shown through the courtesy of the magazine Modern Packaging.

Among those present were: R. L. Barton, Wayne Beery, N. Berger, C. A. Bragenton, Kenneth Buttery, Harry C. Bindford, O. W. Callighan, Harry T. Campion, W. L. Cassiday, Fred L. Chappell, Jr., A. W. Cob, Norman J. Cowie, Fred Crysler, F. B. Curtenius, George W. Dean, M. A. Earl, E. Erickson, Roy Fehr, M. S. Fogerty, B. E. Freeman, R. D. Freeman, G. Gerpheide, H. M. Gibb, John W. Gilkey, G. E. Graham, L. L. Griffiths, Jr., Jack Hartung, W. F. Hathaway, R. A. Hayward, J. A. Heenan, G. Ingling, W. Kent Kidder, Frank Libby, L. E. Longstreth, D. E. McDowell, Tom McSpadden, Archie P. Nevins, H. Nundorf, H. W. O'Brien, H. M. Olson, John L. Russell, M. H. Rutz, M. O. Shea, Hugh Smith, M. H. Stetson, Robert Stewart, Dwight L. Stocker, W. S. Taylor, John Tooker, Paul Torre, Joe Waber, D. Watkins, Earl S. Weber, Arthur Weinland, Frank Whittington, Merle R. Wilkins, and James A. Wise.

Oxford Paper Co. Makes Exhibit

The merchants of the Oxford Paper Company met on Monday, February 17, in New York. On the same day the company made a very interesting exhibit of its printing papers at the Canadian Club, Waldorf-Astoria Hotel. All the printed pieces on display were commercial productions and all were printed on Oxford paper. In arranging the exhibit, each unit was confined to one class or type of industry or business. Consequently each unit encompassed a range of printed work and included letterpress, offset and gravure. It also included fine color work, black and white halftone, line illustration and type varieties; and printing with metallic inks, gloss inks and overprint varnish. The exhibit served to demonstrate how completely the line of Oxford book papers blanket the needs and demands of publication and advertising printing.

Sabin Robbins Votes Dividend

The Sabin Robbins Paper Company has declared the regular quarterly dividend of $1.75 a share on preferred stock, payable April 1 to stockholders of record March 20.

Import Committee

In 1924, sixteen years ago, the Import Committee of the American Paper Industry was formed for the purpose of stopping a flood of illegal imports from European nations which were damaging all business in the United States.

Dumping, misclassification and under-valuation were being resorted to, and these evasions of our tariff laws were working havoc with American industry.

In 1923, the year before the Import Committee was formed, imports of dutiable paper totaled a value of $17,500,000. In 1939, the total value had dropped to $11,500,000. There was, therefore, produced in the United States, in 1939, alone, $6,000,000 worth of paper which were it not for the Committee, would in all probability have been placed with foreign manufacturers. Of this amount, about $3,000,000 was for wrapping papers, $1,000,000 for book and other printing papers, and the balance in other grades of paper and board.

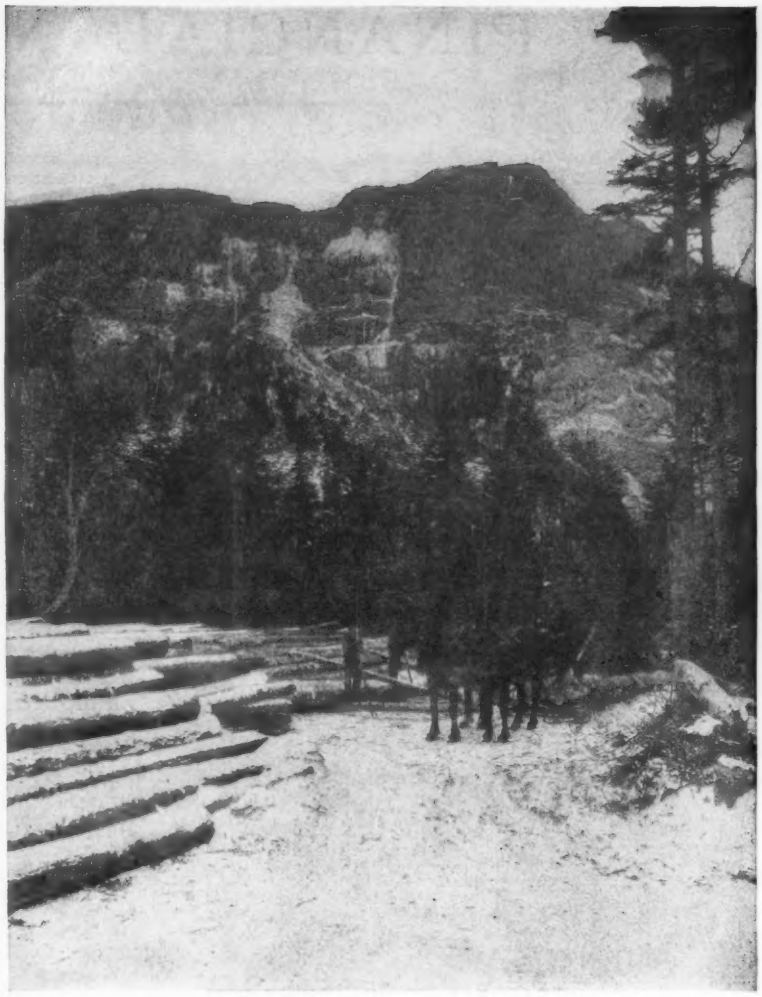
Computing the decrease in imports since the Import Committee was formed, there has been a total of between $60,000,000 and $65,000,000 of business placed with American mills in the years from 1924 to 1939 inclusive, which, on the basis of imports in 1923, would have been purchased abroad.

Practically all of this diversion of purchases from foreign to domestic mills has been the result of the Import Committee's work in stopping the misclassification, dumping and under-valuation of imported papers. The enforced payment of the proper duties eliminated much of the foreign competition.

Intangible results of the committee's work are many.

The Import Committee has also been responsible for all of the detailed work in connection with tariff legislation, such as the Tariff Act of 1930, and the efforts, even though not always effective, to prevent the wrecking of domestic markets by duty reductions through Reciprocal Trade Agreements.

While the active competition of European mills is for the time being negligible, many questions involving competition with such countries as Canada, Great Britain and Japan are constantly arising.



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O. J. LELOFF, Vancouver, Wash.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 19, 1941

	High	Low	Last
A. P. W.	1⅝	1⅝	1⅝
Armstrong Cork Co.	30¼	28¾	29¼
Celotex Corp.	8⅜	7⅜	7¾
Celotex Corp., pf.	68	66¾	66¾
Certain-Teed Products Corp.	4⅛	3¾	3⅞
Certain-Teed Products Corp., pf.	30¾	25½	25¾
Champion Paper & Fibre Co.	18¾	17½	17½
Champion Paper & Fibre Co., pf.	105	105	105
Congoleum-Nairn Co.	18¼	17	17¼
Container Corp. of America	14	12½	13¼
Continental-Diamond Fibre Co.	8	7⅜	7¾
Crown-Zellerbach Co.	13½	12⅜	13
Crown-Zellerbach Co., pf.	89	87	87
Flintkote Co.	13⅛	12¾	12¾
Robert Gair	1⅞	1¾	1¾
Robert Gair, pf.	15⅝	14¾	14¾
International Paper & Power	12⅜	10⅞	11
International Paper & Power, pf.	59⅜	57½	57¾
Johns-Manville Corp.	56½	55	56½
Johns-Manville Corp., pf.	127	126	126
Kimberly Clark Corp.	34¼	34¼	34¼
MacAndrews & Forbes	29	29	29
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	25⅞	25	25
Mead Corp.	8⅛	7½	7½
Mead Corp., pf.	71½	71	71
Paraffine Companies, Inc.	29	29	29
Paraffine Companies, Inc., pf.	102½	101½	101½
Rayonier, Inc.	13½	12¾	13
Rayonier, Inc., pf.	26½	24½	25
Ruberoid Co.	16¼	15½	16¼
Scott Paper Co.	35	35	35
Scott Paper Co., pf.	114¼	113	113
Sutherland Paper Co.	22	21	21⅛
Union Bag & Paper Corp.	10⅝	9¾	10
United Paperboard Co.	3⅛	3	3
U. S. Gypsum Co.	62½	60	60
U. S. Gypsum Co., pf.	174	174	174

New York Curb Exchange

High, Low and Last for Week Ending February 19, 1941

	High	Low	Last
American Box Board Co.	4½	4⅜	4⅜
Brown Co., pf.	14½	14½	14½
Great Northern Paper	39½	38	39
Hummel-Ross Fibre Corp.	5½	5¼	5¼
National Container Corp.	11½	11	11⅛
St. Regis Paper Co.	2	1¾	1⅞
St. Regis Paper Co., pf.	74¼	70	70
Taggart Corp.	3	2¾	2¾

Union Bag Nets $2,129,946

Net profit of Union Bag and Paper Corporation for 1940 after all charges, including provision for Federal income and excess profits taxes, amounted to $2,129,946 compared with $965,532 in 1939, according to a preliminary statement (subject to final audit) made public today by Alexander Calder, president. The 1940 earnings are equivalent to $1.67 per share on 1,272,437 shares of outstanding capital stock compared with 76 cents per share earned in the preceding year on 1,262,729 shares outstanding at December 31, 1939.

Sales for the year totaled $22,081,033, an increase of 25 per cent over 1939 when sales of $17,561,967 were reported. Tonnage volume of 244,104 compared with 213,015 the year before.

Increased sales of the company's higher quality products, such as specially designed containers, and papers for construction purposes, contributed materially to the year's higher sales volume and net profit, Mr. Calder said. The improvement in business did not result from war or defense activities or their influence on prices, he explained. While the average price of grocery bags, the company's largest single item, advanced above the 1939 level, it still remained about 8 per cent below 1937 prices.

The improvement in earnings, Mr. Calder pointed out, was accomplished despite an increase of over 800 per cent in taxes. The year's Federal taxes were equivalent to 74 per cent of the company's net profit compared with a ratio of 17 per cent in the previous year. The provision for Federal income and excess profits taxes required $1,566,000 compared with $168,000 in 1939, an increase of $1,398,000. Of the total, $883,000 represented income tax and $683,000 excess profits tax.

U. S. Gypsum Nets $7,052,974

The United States Gypsum Company and its subsidiaries reported for the year ended on December 31, 1940, net income of $7,052,974 after depreciation, depletion, Federal income taxes and provision of $1,340,000 for excess profits tax and other charges.

After allowing for dividend requirements on the 7 per cent preferred stock, last year's net is equal to $5.44 a share on the 1,195,662 shares of $20-par common stock. In 1939 the company earned $7,365,847, or $5.71 a share on the 1,194,960 common shares outstanding at the close of that year.

As of December 31 current assets amounted to $30,050,284, including $14,641,283 cash and marketable securities, while current liabilities were $6,873,492. At the end of 1939 current assets were $25,281,389, with cash and marketable securities of $12,077,454, while current liabilities aggregated $3,836,219.

Taggart Corp. Earns $548,774

Net income of the Taggart Corporation for 1940 amounted to $548,774 in 1940. After preferred dividends this was equal to 58 cents a share for 816,633 common shares and compared with $597,648, or 64 cents a share, earned in 1939, it was announced yesterday by Roy K. Ferguson, president. The provision for Federal taxes was $257,000, an increase of $96,000, or 59.62 per cent.

Net sales were $8,338,388, against $6,931,945 in 1939, while cost of sales, expenses and depreciation reserves rose to $7,391,172 from $5,984,585.

Eddy Paper Corp. Reports $557,525

Eddy Paper Corporation for 1940 reports net profit, $557,525, equal to $3.01 a share on 185,045 capital shares, against $328,404 or $1.77 a share the year before; net sales, $8,651,087 against $8,577,629.

Halifax Pulp Reports $87,814

The Halifax Power and Pulp Company, Ltd., reports for the six months to December 31: Net income before income taxes, $87,814; gross sales, $521,344.

Keyes Fibre Nets $245,687

The Keyes Fibre Company reports for 1940: Net income, $245,687, against net income of $205,216 the year before.

$1 Per Cord on Stumpage

WASHINGTON, D. C., February 17, 1941 — Contention that farmers should receive at least $1 a cord for their stumpage, if they are to participate in the general forestry program, was advanced by C. L. Forsling, assistant chief of the Forest Service, appearing before the House Committee on Agriculture last week.

Mr. Forsling, testifying on the Fulmer resolution to investigate woodpulp prices, outlined a nine-point program which he declared would be necessary to aid smaller farmers to co-operate in the program of forest conservation. The price of $1 per cord, he said, would be necessary "as an incentive" to farmers who do not now, because of financial and other reasons practice forest conservation.

The Forest Service representative's nine-point program was as follows:

1. Furnish a marketing service, so that farmers may know prices paid on the open market.
2. A program of education, which would bring home to the farmer the absolute necessity of forest conservation.
3. Extension of farm credit, to aid farmers financially distressed to cooperate in the program.
4. Participation of State, municipal and Federal Government in the program to adjust timber prices.
5. Extension of fire protection.
6. Extension of research.
7. An increase in the number of public holdings and ownerships in forest lands, since many of the private operators are not developing their holdings as they might.
8. Legislative regulation, assuring absolute forest protection and conservation.
9. Conservation payments.

The nine-point program was advanced by Mr. Forsling as a panacea for the present situation existing in the forestry industry, which he predicted would be "cut clean" unless some action was taken.

At present, Mr. Forsling pointed out, there existed some 6,000,000 acres of forest land in the United States. As a general rule, he said, many of the larger timber operators who have slashed timber land are those who have failed to participate in any program looking toward the conservation program.

ANNOUNCING

Causplit Cement

RESISTANT TO STRONG

CAUSPLIT CEMENT, which can readily handle a wide range of strong acids, alkalies and solvents at temperatures up to 350° F., has properties never before available in such products. Causplit's chemical resistance is unique; and it is quick-setting, tough and durable, easy to handle, resistant to abrasion and to rapid changes in temperature.

Extensive tests have proved that Causplit is admirably suited to the corrosion-proof construction of industrial equipment lining. In fact, Causplit Cement represents a considerable improvement over Penchlor Acid-Proof Cement and Asplit Cement, which have been successfully used in many industries for more than 7 years.

CHEMICAL PLANTS: Causplit Cement makes an ideal mortar because it is so versatile—resists muriatic and other strong acids, potassium carbonate and other salts, ammonia and various strong alkalies, phenol, toluol, alcohols, acetone and numerous other chemicals. You can use Causplit where conditions are alternately alkaline and acid—where other cements will not endure.

PULP AND PAPER MILLS: For pulp digesters, bleaching system equipment, acid towers, recovery systems, etc., Causplit Cement is economical and durable. It is unaffected by 50% caustic soda, hypochlorites and chlorine, sulfurous acid, sodium sulfite, sodium sulfide and other chemicals used in the industry. Causplit withstands abrasion, repeated washings and sudden temperature changes.

STEEL MILLS: Causplit Cement is adapted to pickling, neutralizing and degreasing tanks and similar equipment, because it's not harmed by concentrated sulfuric acid, hydrofluoric acid or hydrochloric acid, nor by strong alkalies and solvents. Causplit maintains tight joints and preserves bricks even under severe service conditions, lasting far longer than other types of cement construction.

Write or wire us for FREE TEST KIT, including samples, booklet of information and test data showing Causplit's resistance to various acids, alkalies and solvents. Pennsylvania Salt Manufacturing Co., Widener Bldg., Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.

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CONSTRUCTION NEWS

Oconto Falls, Wis.—The Falls Pulp and Paper Company, manufacturer of tissue, crepe and kindred papers, has approved plans for modernization and improvements in mill, and will place work under way at once. General contract has been awarded to the Baker Construction Company, 310 Pine street, Green Bay, Wis. No estimate of cost announced.

North Kansas City, Mo.—The Lloyd A. Fry Roofing Company, 5302 West 66th street, Chicago, Ill., manufacturer of prepared roofing products, roofing papers, etc., has completed plans for new branch plant on 5-acre tract of land at Armour road and Jasper street, North Kansas City, recently acquired. It will consist of a main one-story unit, 250 x 600 feet, and auxiliary structures, including boiler house, and is estimated to cost about $350,000, with equipment. Machinery will be provided for an initial output of approximately three carloads per day. General erection contract has been awarded to the Hiram Elliott Construction Company, 1016 Baltimore street, Kansas City, Mo., and work is scheduled to begin at once. Keene & Simpson, Land Bank Building, Kansas City, are architects.

Bogalusa, La.—The Gaylord Container Corporation, Pulp and Paper Division, 2820 South 11th street, St. Louis, Mo., manufacturer of kraft wrapping papers, corrugated paper stocks, etc., is continuing the award of structural steel framing for new units at mill at Bogalusa, previously referred to in these columns, and has placed another contract for about 100 tons with the Ingalls Iron Works, Birmingham, Ala., which will begin delivery soon. This will be used for a new building for expansion in bleaching plant. Same company also will furnish structural steel for new digester building. This is part of large expansion program at mill, with entire project to cost close to $6,000,000, with equipment. Work will be pushed actively to provide for completion of different units next summer.

Kalamazoo, Mich.—The Sutherland Paper Company, manufacturer of paper board stocks, box boards, etc., is running on a capacity schedule at mill, with full working quota, and will continue on this basis for an indefinite period. The company has recently reported an expenditure of about $748,000 for mill expansion and improvements during 1940, and which facilities are now available for increased output.

Sandston, Va.—The F-F-V Equipment Corporation, care of R. T. Lipscombe, Sr., 510 Bond Building, Washington, D. C., secretary and treasurer, recently organized to manufacture specially-treated paper cups and containers for frozen food service, using dry ice, has plans under way for new plant at Sandston, where tract of land has been selected. It will be one-story, about 100 x 300 feet, estimated to cost close to $100,000, with equipment. Erection is scheduled to begin soon. This will be known as Plant No. 1, with Plant No. 2, to be constructed closely following, to be given over to dry ice and byproducts manufacture.

Cumberland, Md.—The Celanese Corporation of America, Inc., manufacturer of rayon products, has work nearing completion on two new additions to branch mill at Amcelle, near Cumberland, recently referred to in these columns, one to be used for general production and the other for storage and distribution. Entire project is reported to cost over $350,000, including equipment. Company is reported to be planning a general expansion program at mills, to be carried out over a period of about 24 months, to include new buildings and equipment installation to represent a total investment of more than $10,000,000, in that period. Main offices are at 180 Madison avenue, New York, N. Y.

Elkhart, Ind. — The American Coating Mills, Inc., manufacturer of clay-coated box board products of various kinds, has plans nearing completion for alterations and improvements in two-story mill at foot of Division street, 48 x 140 feet, and will award contract at early date. Work is reported to cost close to $20,000. Carl A. Nelson, 1401 Main street, South Bend, Ind., is consulting engineer.

Cloquet, Minn.—The Wood Conversion Company, manufacturer of insulating board, building board, etc., has plans under way for new addition to mill, to be one-story, reported to cost over $50,000, with equipment. Company also will make alterations and improvements in present mill. It is understood that bids will be asked soon on general construction contract.

New York, N. Y. — Stricks Paper Company, commercial paper goods, has leased ground floor space in building at 120 West 17th street, and will occupy for storage and distribution, sales, etc.

Chicago, Ill. — The American Decalcomania Company, 4326 Fifth avenue, manufacturer of processed paper transfers, etc., has taken out a permit for erection of new addition to plant, previously referred to in these columns, and work is being placed under way. It will be one-story, about 75 x 125 feet, reported to cost in excess of $60,000, including equipment. Facilities will be provided for considerable increase in present capacity. Erection contract will be handled by the All-Building Construction Company, 179 West Washington street, Chicago. L. R. Solomon, 185 North Wabash avenue, Chicago, is architect.

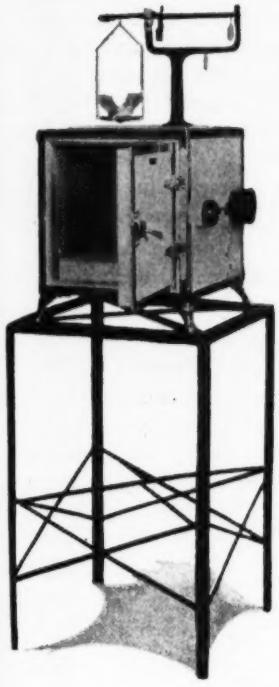
Thetford Mines, Que.—The Asbestos Corporation, Thetford Mines, has plans under way for new one-story addition to mill. Cost is reported close to $50,000, with equipment. Work is scheduled to be carried out early in spring.

New Companies

Boston, Mass. — The Crown Paper Specialty Company, 197 Portland street, has been chartered with capital of $10,000, to deal in paper products of various kinds. Joseph Fiorentino is president and C. L. Bagnulo, treasurer.

Los Angeles, Calif.—Economy Envelopes, 4081 Mission road, have filed notice of organization to manufacture and deal in commercial envelopes and allied products. V. M. Feldman is head.

WILLIAMS STANDARD PAPER MOISTURE TESTER



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PAPER TRADE JOURNAL
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Henry J. Berger
EDITOR

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THE YEAR IN PAPER

A new high production record was established by the American paper industry in 1940. It was the fourth new high record set up in the last five years. Total production of all grades of paper in 1940 aggregated 14,372,000 tons, against a capacity of 16,700,000. This is an increase of 6½% over 1939, production totaled 13,493,476 tons, against a capacity of 16,500,000 tons. Idle mill capacity in 1940 was 14%, compared with 18% in 1939. The best showing of actual production against capacity was in newsprint at 93%, followed by 91% in tissue paper, 90% in wrapping paper, 89% in groundwood papers, 86% in paper board, 83% in writing paper, 82% in uncoated book paper, down to cover paper at 68%.

Newsprint production in North America in 1940 totaled 4,785,000 tons, an increase of 668,000 tons over 1939, and excepting 1937, the highest on record. Of this total Canada supplied 3,149,000 tons or 71%, United States 1,013,000 tons or 21%, and Newfoundland 353,000 tons or a little over 7%. The gain in Canada was 19.2%, in the United States 7.9%, and in Newfoundland 14.5%. Canadian production was larger than in any year, excepting 1937, while the United States produced more newsprint in 1940 than in any year since 1931. Shipments more than kept pace with production and at the end of 1940 stocks on hand or in transit to the publishers totaled 356,000 tons. No oversupply was reported from mills or publishers. Newsprint prices were stable for the entire year at $50 per ton for rolls, and $58 per ton for sheets.

Canadian newsprint operations averaged 78.3% for 1940, compared with 66.8% in 1939, with 62.4% in 1938 and with the all-time record of 93.9% in 1937. Canadian shipments to the United States amounted to 2,909,360 tons, compared with 2,194,126 in 1939, with 1,881,020 tons in 1938, and with 2,909,360 tons in 1937. Canadian publishers took 183,894 tons; overseas shipments totaled 657,588 tons, compared with 477,594 tons in 1939, with 475,779 tons in 1938, and with 525,756 tons in 1937.

Production of uncoated book paper in 1940 aggregated 1,424,000 tons, compared with 1,374,000 tons in 1939, an increase of 3.6% and surpassing production of 1937 by 9,000 tons. Ships of uncoated book paper totaled 1,495,000 tons and exceeded shipments in 1939 and 1937. In contrast, coated book paper production decreased from an output of 290,000 tons in 1939 to 258,000 tons in 1940, while ships totaled 259,000 tons in 1940.

Kraft paper output for 1940 established a new high record by a small margin. Production and shipments were more uniform than in the preceding year. The kraft paper division also entered the $100,000,000 annual sales class for the first time. Total shipments amounted to 104% of the 1939 volume. Kraft paper machines operated at an average rate of 84% of the computed 1940 capacity. This compares with 82% in 1939.

No new machines were installed during 1940, but a few machines not formerly used in making kraft paper were shifted to kraft. Imports were less than two-tenths of domestic sales. Exports increased to 4% of domestic shipments. A comparison of operations in 1940 with 1939 are not likely to give a clear view of the kraft paper industry. The last half of 1939 was abnormal because of the buying wave that set in upon the declaration of hostilities in Europe in September of that year. The first half of 1940 was abnormal because similar conditions again developed with the invasion of Norway in April. The volumes in the first half of 1940 were substantially higher than in the first half of 1939, but declined to nearer normal levels in the last half of 1940.

Writing paper production in 1940 was 625,000 tons, an all-time high record, compared with 594,000 tons in 1939 and with 607,590 tons in 1929. Shipments to domestic markets were under 1939, the increase being made up of exports and purchases by the United States Government. Exports of all grades of writing paper in 1940 aggregated 50,393 tons, compared with 19,665 tons for 1938, or a gain of 157%. The United States Government purchased 9% of the domestic production in 1940, compared with 7% in 1939.

Paper board production in 1940 surpassed all records for total production for 1940. Domestic output aggregated 396,000 tons, an increase of 7% over 1939, the previous highest year. The average operation ratio for the paper board industry for the year was 73.0%. The paper board industry is the largest consumer of paper stock, the average furnish being 85% waste paper and 15% wood pulp, although some grades are made almost entirely from pulp. The consumption of waste paper in 1940 is estimated at between 4,250,000 and 4,500,000 tons. The miscellaneous or "all other" group has shown the greatest expansion during 1940, because of the many new uses found for paper board and the endeavors of paper board manufacturers to enter new fields heretofore supplied with a different type of material. Price changes in paper board over the year were slight, with less than $2.50 change per ton above or below the average.

Wood pulp production of the United States of all grades established a new high record of 9,007,000 tons for 1940, compared with a total production of 6,993,334 tons for 1939. The estimated pulp consumption of the United States for 1940 is 9,750,643 tons, compared with 8,880,271 tons for 1939.

Imports of wood pulp for 1940 aggregated 1,224,569 tons, valued at $60,193,666, compared with 2,026,413 tons, valued at $75,877,826 for 1939.

Exports of chemical pulp, all grades for 1940 aggregated 476,975 tons, valued at $29,746,046, compared with 139,504 tons, valued at $6,493,140 for 1939. Pulpwood imports for 1940 were 1,435,820 cords, compared with 1,130,874 cords for 1939.

Stillwater Power Project Progresses

Construction work is proceeding satisfactorily on the addition to the Lois River power project of the Powell River Company at Stillwater, 13 miles south of the big pulp and paper town of Powell River, B. C. The company erected the Stillwater plant in 1929 and at that time built a temporary log crib dam and cleared and prepared a site for a permanent location later. A 22,000-hp. generator was installed in the Stillwater power house.

Now excavation for the foundation of the permanent dam is in progress and has been carried down to a depth of approximately 50 feet on each side of the riverbed. In the west side excavation concrete has been poured to practically riverbed level and placing of concrete in the east side section was commenced. The wing wall, thrust block and two adjacent sections on the west side of the dam are practically complete at this time. Up to date, about two-thirds of the total excavation has been taken out and about one-twelfth of the total amount of concrete has been placed.

Weather conditions have, throughout, been extremely favorable, and, so far, it has not been necessary to pass any floodwaters down the riverbed.

And so once again the famous Stillwater logging tract, where Brooks and Scanlon cut some of its finest limits, hears the deep rasp of the excavator's drill and the rushing whirr of the concrete mixer. The whole area was well known to the old B. C. logger, and some of the tallest and straightest timbers in this hemisphere were logged near the present scene of activities. Almost on the identical spot where the big concrete dam will arch across the waters of Lois River is the notorious Copenhagen Canyon, across which hundreds of brooks, Scanlon loggers used to ride daily. The canyon was so named from the number of discarded snuff boxes tossed into its rocky depths by loggers on their way up and down the line.

Now Century Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 17, 1941—Knight, Allen & Clark, Inc., now operated as the Century Paper Company, Inc., Knight, Allen & Clark Department, is continuing in business at the same location, 275 Congress street, with the same mill lines and the same salesmen. F. J. Halloran is the treasurer of the Century Paper Company.

Production Ratio Report*

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1941		CORRESPONDING WEEKS, 1940	
January 4	79.9%	January 6	88.0%
January 11	86.3%	January 13	92.7%
January 18	85.6%	January 20	90.1%
January 25	86.8%	January 27	91.2%
February 1	85.8%	Februarv 3	89.2%
February 8....(Prelim.)	86.8%	February 10	87.9%

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1940	90.2%	86.2%	83.9%	86.3%	91.8%	93.8%	87.1%
1941	84.9%	.....	.....	.....	.....	.....	.....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1940	87.2%	83.2%	88.0%	86.9%	83.3%	87.5%
1941	.....	.....	.....	.....	.....	.....

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941
Year to Date.	66.4%	76.5%	89.9%	65.1%	78.9%	89.8%	85.3%
Year Average	70.5%	81.3%	80.6%	72.3%	84.9%	87.5%	.....

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%
1940	71%	70%	69%	70%	76%	79%	72%
1941	75%	....	....	....	....	....	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%
1940	74%	72%	79%	77%	71%	73%
1941	....	....	....	....	....	....

Week end. Jan. 4, 1941—59%
Week end. Jan. 11, 1941—77%
Week end. Jan. 18, 1941—78%
Week end. Jan. 25, 1941—78%
Week end. Feb. 1, 1941—79%
Week end. Feb. 8, 1941—79%

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

Container Corp. Gets Baltimore Plant

Walter P. Paepcke, president, announced here Monday that Container Corporation of America, manufacturer of pulp, paperboard, and shipping containers, has acquired the assets of Reed Container Company of Baltimore. The Container Corporation of America will take charge of the Baltimore plant immediately.

"The Reed Company, which makes corrugated shipping boxes, was acquired," Mr. Paepcke said, "as another step in the corporation's policy to widen progressively the geographical area of its manufacturing and service facilities.

"I am confident the combined abilities of the Reed and Container Corporation organizations will raise substantially the speed and quality of service to users of shipping containers in the Baltimore area," Mr. Paepcke added.

Appointment of G. H. Linde of Philadelphia, who has been with Container Corporation many years, as manager of the Baltimore division, also was announced. Mr. Linde has been assistant sales manager at the company's Philadelphia plant. Prior to that assignment, he was sales manager of the Natick, Mass., factory.

In addition to Philadelphia, Baltimore, and Natick, mills and factories of Container Corporation are at Chicago and Rock Island, Ill.; Wabash, Carthage, and Anderson, Ind.; Cleveland, Cincinnati, and Circleville, Ohio; Wilmington, Del.; Fort Worth, Texas; and Fernandina, Fla.

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(PATENT APPLIED FOR)

This machine is the answer to the demand for a better a nd simpler paper machine drive because:

1 It is accurate.
2 It makes possible the following reduction in costs: Capital investment through elimination of basement, Floor Space, Friction Load (Power), Lubrication, Maintenance, Shut-downs, and Man-Hour Supervision.
3 It locates the variable speed line shaft conveniently right on the floor back of the paper machine.
4 It eliminates the necessity of a basement, a mezzanine floor, or an overhead line shaft.
5 It is economically justified in a steadier, smoother paper production.
6 It permits over twice the adjustable draw range of the standard cone pulley set-up, and makes possible a much finer adjustment than on the average drive, thereby greatly reducing strains and breaks.

"Compact and accessible"

THE SANDY HILL IRON & BRASS WORKS • **HUDSON FALLS, N. Y.**

Paper Machinery Specialists

In 1940

55 REGULATORS *including*

35 REPEAT ORDERS *to*

32 MILLS *in the United States, Canada and Australia*

PRICES

Standard pump type and mixing box type regulators, complete with vat, motor driven water valve, and motor

$500

Special heavy density regulators

$550

Standard weight regulating stuff boxes, consisting of mixing box regulator as above, and bronze stuff gates, ready to be connected to your piping

$535 to $550

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